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Smoking-Related Self-Concepts and Value Expressive Messages: Effects on the Determinants of Smoking Cessation

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Abstract
Despite well-known risks, millions of Americans smoke cigarettes. Researchers have called for new approaches to smoking cessation messages that persuade smokers to quit their habit. Through a series of five web-based studies, this dissertation examines the relationship between smoking-related self-concepts and determinants of smoking cessation. Two smoking-related self-concepts are considered: the smoker self-concept (SSC) and the abstainer self-concept (ASC). This dissertation answers whether value-expressive messages with ASC or SSC frames have potential to increase smoking cessation intentions, self-efficacy, and attitudes.

The first study uses a cross-sectional design to describe the relationship between the smoking-related self-concepts and the determinants of smoking cessation. The second study pilot tests messages with ASC and SSC frames and examines their priming and persuasion effects. The third study explores value priorities among smokers and identifies values with the highest and lowest priority. The fourth and fifth studies pilot test ASC and SSC frame messages with values content to ensure that the messages adequately express their respective values. The final study is a web-based survey experiment with a two frame (SSC x ASC) by two value (high priority vs low priority) design with a no message control group.

Results provide evidence that smoking-related self-concepts explain variation in the determinants of smoking cessation above and beyond the effects of other smoking-related individual characteristics. ASC and SSC message frames have potential to prime these constructs. Smokers place the highest priority on the value of self-direction, and the least priority on the value of power. Messages that combine an ASC frame with the high priority value of self-direction increase the determinants of smoking cessation among individuals who have low identification with the SSC, but may have unintended boomerang effects on individuals who identity highly with the SSC.

The findings support the role of smoking-related self-concepts as individual difference variables that moderate the effects of smoking cessation messages on the determinants of smoking cessation behaviors. Implications of these findings are discussed and directions for future research are proposed.

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DEDICATION

For my husband, who never stopped supporting me through this journey, and for my son, who showed me what is truly important in this life.

ABSTRACT

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Despite well-known risks, millions of Americans smoke cigarettes. Researchers have called for new approaches to smoking cessation messages that persuade smokers to quit their habit. Through a series of five web-based studies, this dissertation examines the relationship between smoking-related self-concepts and determinants of smoking cessation. Two smoking-related self-concepts are considered: the smoker self-concept (SSC) and the abstainer self-concept (ASC). This dissertation answers whether value-expressive messages with ASC or SSC frames have potential to increase smoking cessation intentions, self-efficacy, and attitudes.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

Cigarette smoking is the top preventable cause of morbidity and mortality in the United States, leading to increased risk for cardiac, vascular, and pulmonary disease, as well as various cancers (Mokdad, Marks, Stroup, & Gerberding, 2004). The prevalence of smoking has dramatically reduced in the past 50 years (Centers for Disease Control and Prevention, 2014b). However, declines in smoking rates have fallen short of objectives set out in Healthy People 2010 (Centers for Disease Control and Prevention, 2014b). Despite well-known risks, millions of adults smoke cigarettes.

Anti-smoking messages delivered through mass media campaigns are one route proven to impact smoking cessation behaviors (Centers for Disease Control and Prevention, 2014a). Researchers have called for new approaches to developing smoking cessation messages that would enhance individuals' likelihood of quitting smoking (Hastings & MacFadyen, 2002; Shadel & Cervone, 2011). Key predictors of smoking cessation behaviors are smoking cessation intentions, self-efficacy, and attitudes (e.g. TRA/TPB, Fishbein & Ajzen, 2010; Morton & Duck, 2001; HBM, Rosenstock, 1960). Evaluating individual difference constructs that have potential to impact these determinants is important for developing approaches to effective smoking cessation messages.

Smoking-related self-concepts may be important target areas for messages aiming to impact the determinants of smoking cessation. Two aspects of the self are described by smoking-related self-concepts: the abstainer self-concept (ASC), or identification with a self as a non-smoker; and the smoker self-concept (SSC), or identification with a self as a smoker. Studies have found that differences in identification with the smoking-related self-concepts regulate smoking behaviors (Falomir & Invernizzi, 1999), impact smoking cessation self-efficacy, (Shadel & Cervone, 2006), and predict the likelihood of three month abstinence from cigarettes in clinical interventions (Shadel & Mermelstein, 1996; Shadel, Mermelstein, & Borrelli, 1996). Thus, targeting these constructs in smoking cessation messages may be an effective route for motivating smoking cessation behaviors.

This study aims to assess the role of smoking-related self-concepts in smoking and smoking cessation behaviors, and to develop messages that could impact smoking cessation behaviors by focusing on these self-concepts. This research adds to the literature by first describing the distribution of identification with the ASC and SSC among smokers and then gathering evidence for the relationship between identification with the ASC and SSC and other smoking-related characteristics. Next, this study explores the relationship between identification with the ASC and SSC and smoking cessation intentions, self-efficacy, and attitudes. Finally, this research evaluates the potential of smoking

cessation messages to impact identification with and prime these self-concepts through the use of value-expressive messages.

Values organize self-concepts and motivate individuals to engage in behaviors that align one's self-concept with one's values. Thus, messages that illustrate how self-concepts align with or are contrary to personal values may impact identification with the smoking-related self-concepts and thus have a positive effect on the determinants of smoking cessation.

The practical goals of this research are (a) to describe the smoking-related self-concepts and validate the relationship between identification with the smoking-related self-concepts and the determinants of smoking cessation (Study 1) (b) to evaluate the priming and persuasive effects of ASC and SSC message frames (Study 2) (c) to describe value priorities among smokers and determine whether identification with smoking-related self-concepts impacts these priorities (Study 3), (d) to develop messages which express values within ASC and SSC frames (Study 4 and Study 5), and (e) to expose smokers to value-expressive smoking cessation messages with the ASC and SSC frames and evaluate their impact on the determinants of smoking cessation (Study 6).

Smoking-related self-concepts

An individual's self-concept describes their identity at a collective level (Markus & Nurius, 1986; Shadel et al., 1996). Also known as social-identity

(Harwood, 2006; Oyserman, Fryberg, & Yoder, 2007; Slater, 2007), self-categorization (Hogg & Reid, 2006; Tarrant & Butler, 2011), or self-schema (Shadel & Mermelstein, 1996; Stein, Roeser, & Markus, 1998), a self-concept is constructed from behaviors and intentions to engage in behaviors (Wheeler, DeMarree, & Petty, 2007). One knows who they are by the ways that they act or wish to act. Though self-concepts develop out of behaviors, the cognitions associated with the self-concepts differ from attitudes and beliefs related to a behavior and instead are attitudes and beliefs about the behavior as relevant to the self.

Self-concepts shape how individuals define and view themselves and how they desire others to view them (Shepperd, Rothman, & Klein, 2011). Self-concepts classify inclusion into socially defined groups constructed through norms, attitudes, and behaviors distinguishing the group from others (Hogg & Reid, 2006). In turn, an individual's self-concept serves a de-individuating function, causing conformity to standards of thoughts, feelings, and behavior that are aligned with that self-concept (Berger & Heath, 2007; Harwood, 2006).

Identification with a self-concept implies acceptance and approval of the behaviors associated with that self-concept and thus motivates a relevant behavior independently of attitudes and beliefs about that behavior (Biddle et al., 1985; Falomir Pichastor, Toscani, & Despointes, 2009; Oyserman et al., 2007). Rather than relying on attitudes towards a behavior, individuals instead behave in

ways perceived to be similar to and congruent with their self-concepts and consistent with their sense of self (for example, Falomir Pichastor et al., 2009). As individuals increasingly identify with a particular self-concept, they are more likely to engage in behaviors that are congruent with that self-concept (Slater, 2006).

The self-concept is multifaceted and individuals hold multiple self-concepts that define their identity (Wheeler et al., 2007). These include current self-concepts as well as future self-concepts to which an individual aspires to belong (i.e. future self-concepts), also known as possible-selves (Shadel & Mermelstein, 1996) or ideal and hoped-for selves (Markus & Nurius, 1986). Future self-concepts are important in that they incentivize individuals to approach behaviors that will actualize that self-concept. Similar to conceptualizations of current group memberships, identification with future self-concepts influences actions people take and actions they intend to take (Oyserman & Destin, 2010; Puntoni, Sweldens, & Tavassoli, 2011; Tarrant & Butler, 2011).

Individuals who smoke are thought to identify to varying degrees with two self-concepts vis-à-vis their smoking habit: a current self-concept as a smoker, the SSC, and a future self-concept as a non-smoker, the ASC (Shadel & Cervone, 2006; Shadel & Mermelstein, 1996). Smoking is a visible act that leads to creation, affirmation, and reinforcement of the SSC. Through the repeated behavior of smoking, an individual's identification with the SSC is affirmed,

reinforced, and signaled to others. The SSC symbolizes the positive and negative characteristics of the self as a smoker (Shepperd et al., 2011) and differentiates that self from non-smokers (Shadel, Niaura, & Abrams, 2000). The addictive nature of smoking makes it particularly identity defining; individuals who are dependent on nicotine are likely to smoke regularly and each cigarette strengthens one's identification with the SSC.

Identification with the SSC has motivational consequences, driving smoking behavior independently of norms, attitudes, peer behaviors, or beliefs about smoking (Biddle et al., 1985; Falomir Pichastor et al., 2009; Oyserman et al., 2007). For example, Biddle et al. (1985) showed that for high-school students and undergraduates, self-referent label's related to smoking (e.g. a non-smoker vs a heavy smoker) predict smoking amount above and beyond other factors such as preferences for smoking.

On the other hand, the ASC is an image of a future self that is focused on positive outcomes and hoped for attributes an individual will possess as a non-smoker. Identification with the ASC involves knowledge and self-efficacy for coping strategies that allow one to become a former smoker by persisting through the discomforts of nicotine withdrawal, overcoming frustration and potential failures, and remaining abstinent by resisting smoking cigarettes. The ability to imagine the self as a non-smoker also plays an important motivational role. The ASC serves as a self-directed exemplar that guides behavior by

allowing individuals to imagine a future wherein they become this self-concept (Comello, 2009; Markus & Nurius, 1986). Smokers who identify with the ASC feel most confident in their ability to quit smoking and report lower levels of nicotine cravings (Shadel & Cervone, 2006). Identification with the ASC also predicts successful smoking cessation for those enrolled in an anti-smoking program (Shadel & Cervone, 2011).

Thus, the predictions of this research are that identification with the SSC will have a negative association with the determinants of smoking cessation and that identification with the ASC will have a positive association with the determinants of smoking cessation.

Smoking-related self-concepts as message frames

The theoretical framework of the active-self account (Wheeler et al., 2007) describes that numerous self-concepts and associated cognitions are stored in memory. A particular setting or context can prime a particular self-concept, bringing that self-concept to mind (Shadel et al., 2000). When a particular self-concept is primed, trains of thought related to that self-concept are activated and these thoughts guide behaviors. Making salient different self-concepts impacts beliefs and intentions to engage in health behaviors (Puntoni et al., 2011; Tarrant & Butler, 2011). In addition, individuals form judgments and evaluations based on cognitive shortcuts involving attitudes that are most accessible (Shrum, 2007).

Active self-concepts lead individuals to interpret persuasive information through the lens of that particular self-concept (Markus & Nurius, 1986). Thus, priming self-concepts may impact the persuasive effects of smoking cessation messages.

The literature suggests that the ASC can be made accessible through a priming manipulation (Shadel, 2004; Shadel et al., 2000). Because the ASC is expected to have a positive relationship with the determinants of smoking cessation, priming of the ASC may increase smoking cessation intentions, self-efficacy, and attitudes. For example, Shadel and Cervone (2006) found that asking participants to read words that corresponded to the ASC (as compared to those corresponding to the SSC) increased response times to items measuring identification with the ASC, and this priming in turn increased smoking cessation self-efficacy and decreased nicotine cravings.

An external stimulus such as a health promoting message can make salient, or prime, a particular self-concept (Comello & Slater, 2011; Roskos-Ewoldsen, Klinger, & Roskos-Ewoldsen, 2013). Framing is one approach to creating messages that make certain features more prominent at the exclusion of others (Price & Tewksbury, 1997). ASC frames that present smoking cessation as a mechanism towards becoming an aspirational conception of the self (i.e. “myself as a former smoker”) may prime the ASC and increase the likelihood that viewer’s engage in smoking cessation behaviors. Messages with an ASC frame

may also impact identification with the ASC. ASC frames provide smokers with routes to enhance their self-image by following the behavioral guidelines in the message. This framing may be persuasive because self-enhancement goals serve as motivations for behaviors, and positive information about self is better recalled and encoded (Escalas & Bettman, 2003). Thus, participants viewing messages with the ASC frames may be persuaded to engage in smoking cessation behaviors and to increase their identification with the ASC.

On the other hand, previous research has not found evidence that the SSC can be primed (Shadel, 2004; Shadel et al., 2000). However, it is important to assess whether the SSC is inadvertently primed by messages with the SSC frames that present the inherent health risks of the self as a smoker. By focusing the viewers' attention on themselves as smokers, these messages may increase the salience of the SSC. Through priming, the SSC may negatively impact the way that smokers process smoking cessation messages, particularly for those who already hold the SSC as identity defining. For example, Falomir Pichastor, Invernizzi, Mugny, Muñoz-Rojas, and Quiamzade (2002) found that smokers with a strong smoker identity decreased their smoking cessation intentions when exposed to an antismoking messages that denied their ability to choose. Thus, if the SSC was primed by a smoking cessation message, the priming effect may lead to avoidance of smoking cessation behaviors.

In addition, messages with the SSC frames may lead to negative reactions in the viewers. Affirmation theory (Sherman & Cohen, 2006) explains that individuals are concerned with their sense of self-worth and messages about risks of health behaviors in which the individual engages create defensiveness because they undermine this sense of self-integrity. Social identity theory (Tajfel, 1978, 1982) adds that having one's membership in a social-group presented as threatening triggers defensive responses, especially when that group is central to an individual's self-concept. Thus, SSC frames may increase defensive reactions in viewers, which in turn would reduce the likelihood of following the behavior recommendations in the message.

The predictions of this research are that a smoking cessation message that frames smoking cessation as a means to enhance the self by becoming a non-smoker (ASC frame) will prime the ASC and increase identification with the that self-concept. Participants exposed to messages with an ASC frame will increase their smoking cessation intentions, self-efficacy, and attitudes. A smoking cessation message that frames smoking cessation arguments as focused on the harms caused by the self as a smoker (SSC frame) will prime the SSC and increase identification with that self-concept. Self-concept theory suggests that these messages will lead to boomerang effects in the form of negative reactions in their viewers. Thus, SSC frames could undermine the

persuasive effects of anti-smoking messages on the determinants of smoking cessation.

Value priorities

Values are overarching schemes that organize self-concepts and motivate individuals to engage in behaviors that are congruent with those values. Values function as a schema or cognitive structure that provide guiding principles in an individual's life and serve as standards for preferred ways of behaving and being (Rohan, 2000). Individuals have a desire to align their attitudes, behaviors, and self-concepts with their values and thus values motivate behaviors that can achieve the end state of that value (Rokeach, 1973; Schwartz & Bardi, 2001).

The overall structure of the system of values is theorized to be universal (Rohan, 2000). All people are thought to hold the same basic set of values and to prioritize certain values over others. Values that have competing motivational structures must be prioritized in order to choose the best course of action. The priority structure of values helps individuals evaluate what is important and what is not important for their own life and thus guides the choices people make.

Table 1. Defining goals of motivational types of values and representative single values

Motivational Type of Value	Defining Goals	Representative Single Values
Benevolence	preservation and enhancement of the welfare of people with whom one is in frequent personal contact	helpful, honest, forgiving, loyal, responsible
Universalism	understanding, appreciation, tolerance, and protection for the welfare of all people and for nature	broadminded, social justice, equality, world at peace, world of beauty, unity with nature, wisdom, protecting the environment
Self-Direction	independent thought and action--choosing, creating, exploring	creativity, freedom, choosing own goals, curious, independent
Stimulation	excitement, novelty, and challenge in life	a varied life, an exciting life, daring
Hedonism	pleasure and sensuous gratification for oneself	pleasure, enjoying life, self-indulgent

Motivational Type of Value	Defining Goals	Representative Single Values
Achievement	personal success through demonstrating competence according to social standards	ambitious, successful, capable, influential
Power	social status and prestige, control or dominance over people and resources	social power, wealth, authority, preserving my public image, social recognition
Security	safety, harmony, and stability of society, of relationships, and of self	social order, family security, national security, clean, reciprocation of favors
Conformity	restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms	obedient, self-discipline, politeness, honoring of parents and elders
Tradition	respect, commitment, and acceptance of the customs and ideas that one's culture or religion provides	respect for tradition, humble, devout, accepting my portion in life

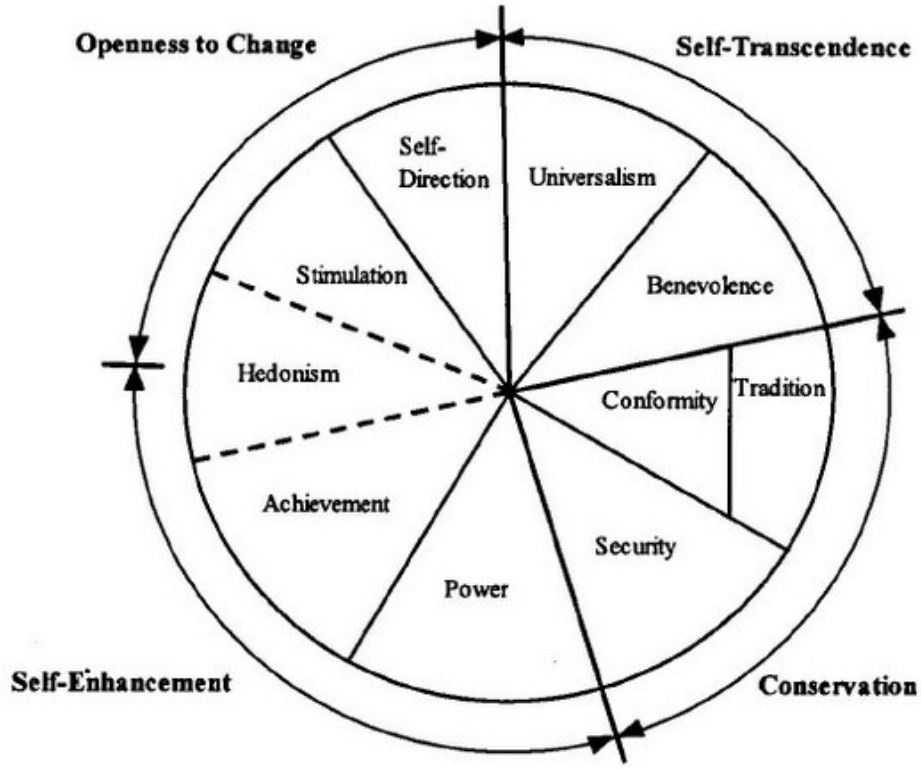
Rokeach (1973) identified thirty-six universal values and developed the Rokeach Values Survey (RVS) to measure rank-order scaling of these values. The RSV is a 36-item survey which asks respondents to rank order two sets of 18 values (e.g. happiness, freedom, self-respect, loyalty, an exciting life, world of peace, and courage). Schwartz and his colleagues (Schwartz, 1992, 2004; Schwartz & Bardi, 2001), added to the study of values by identifying an underlying structure to the value system proposed by Rokeach. Schwartz provided evidence that values form a motivational structure composed of ten "motivational types of values": achievement, benevolence, conformity, hedonism, power, security, self-direction, stimulation, tradition, and universalism.

Each of the ten motivational types of values identified by Schwartz incorporate two or more of the 36 representative single values identified by Rokeach. For example, the motivational type "self-direction" includes the values of creativity, freedom, independence curiosity, and choosing own goals; "achievement" includes the values of successful, capable, ambitious, and influential. Table 1 describes the ten value types and their representative values.

Schwartz further described values as being represented by a circumplex structure where value priorities form a motivational continuum. Values lie on the circumference of a circle and the strength of association between values decreases as the distance between values on the circle increases. The more distant any two values, the more antagonistic their underlying motivations;

neighboring values are highly correlated in their motivational content and circumplex opposite values have low correlations (e.g. .68 vs. .08, Schwartz & Boehnke, 2004). Two of the values - conformity and tradition – share a broad motivational goal and thus are located on the same polar angel on the circle. Figure 1 offers a visual representation of the values construct.

Figure 1. Circumplex structure of value associations



Note: Adopted from Schwartz and Boehnke (2004)

Though individual differences exist (Allport, Vernon, & Lindzey, 1960; Rokeach, 1973), certain values are ranked higher over others universally. In their study of value priorities among individuals living in over 50 nations, Schwartz and

Bardi (2001) found that benevolence is usually ranked as the most important value, followed by self-direction, universalism, security, and conformity. On the other hand, achievement, hedonism, stimulation, tradition and power tend to be ranked as the least important values.

Value expressive-messages

Identification with self-concepts is an indirect expression of values. Thus, messages that explicitly tie a self-concept to the message recipients' values may lead to self-reflection and self-evaluation in terms of that self-concept. A message that illustrates how a self-concept is an expression of the viewer's values should persuade individuals to identify more strongly with that self-concept. On the contrary, a message that illustrates how a self-concept is an expression of the opposite of one's values should persuade individuals to identify less strongly with that self-concept. For example, if a person values power then information that behaviors that form one's SSC contradict those of powerful people may motivate individuals to identity less with the SSC.

These effects should depend on the degree to which the value is prioritized by message recipients. Yzer, Cappella, Fishbein, Hornik, and Ahern (2003) describe persuasion effects as mean changes in attitudes, beliefs or intentions while priming effects could occur independently of mean changes in these outcomes. Thus, though both persuasion and priming effects should be

obtained when the value content of a message matches values that are held as important by the message recipients, these messages could still be effective if they prime the relationship between the ASC and the outcomes without persuading individuals to increase their identification with this self-concept.

Interventions focusing on values are common in the domain of self-affirmation theory. Studies in this area provide participants a chance to reflect an important value in one domain as a means to reduce reactance to information that threatens the self-image in another domain such as health (Sherman, Nelson, & Steele, 2000). These studies have shown that in the area of smoking cessation, self-affirmed report higher intentions to quit smoking (Armitage, Harris, Hepton, & Napper, 2008; Harris, Mayle, Mabbott, & Napper, 2007). However, no studies to date have evaluated the effects of incorporating value-based arguments into smoking cessation messages.

The prediction of this dissertation is that messages expressive of high priority values will lead to greater smoker cessation intentions, self-efficacy, and attitudes than messages expressive of low priority value content. Messages using high priority value content should be perceived as more relevant than messages using low priority value content. Messages should be most persuasive when high priority values are combined with the ASC frames.

Overview of Studies

The studies presented in this dissertation are intended to provide an understanding of how messages that prime smoking-related self-concepts and that focus on prioritized values can increase the likelihood that individuals form intentions, have self-efficacy, and have positive attitudes towards smoking cessation behavior. A review of the literature suggests that to date, smoking-related self-concept frames have not been evaluated in smoking cessation messages. Nor have value priorities been used as an organizing content type for persuasive messages related to health behaviors. This research is the first to evaluate the effects of incorporating value priorities in messages that are framed to prime the smoking-related self-concepts.

Six studies are presented. The first study measures the extent to which identification with the ASC and SSC varies in the population, and explores the relationship between this variation and smoking cessation self-efficacy and intentions. The second study evaluates the potential of message arguments to impact the smoking-related self-concepts through cognitive priming and persuasion. The third study examines the ranking of value priorities among individuals who smoke and explores variation in the rankings based on the smoking-related self-concepts. The fourth and fifth studies evaluate value-expressive messages generated for the purpose of this study to ensure that their message content reflects their respective value. The final study examines the

persuasive and priming effects of the interaction of two message factors: (1) messages with the ASC or SSC frames, and (2) value-expressive messages with high and low priority values.

CHAPTER 2: STUDY 1 (Cross-Sectional Study)

The aims of Study 1 are to (1) describe the role of identification with smoking-related self-concepts in smoking and smoking cessation behaviors, and (2) examine the relationship between smoking-related self-concepts and the determinants of smoking cessation. This study describes the distribution of identification with the smoking-related self-concepts and the relationship between the smoking-related self-concepts and other smoking-related characteristics. This study also answers whether differences in respondents' identification with smoking-related self-concepts are related to smoking cessation intentions and self-efficacy and explain variance in these outcomes above and beyond that explained by other smoking-related characteristics and participant demographics that have been previously identified in the literature as important predictors of smoking cessation.

This study is a descriptive cross-sectional secondary analysis of a web-based survey experiment. The hypotheses evaluated in this study are:

Hypothesis 1: As respondents identify more strongly with the ASC, smoking cessation intentions and self-efficacy will increase. These effects will persist after controlling for other smoking related and demographic variables.

Hypothesis 2: As respondents identify more strongly with the SSC, smoking cessation intentions and self-efficacy will decrease. These effects will persist after controlling for other smoking related and demographic variables.

Method

Participants

This observational study was a secondary analysis of data collected during October and November 2012 by the Annenberg School for Communication at the University of Pennsylvania. The primary goal of the study was to gather adult smokers' evaluations of graphic warning labels on cigarette packages.[1] The aim of the present study was to conduct a secondary analysis of the data in order to investigate the relationship between identification with the smoking-related self-concepts and the determinants of smoking cessation.

This study used a sample of English-speakers ages 18 and older living in the United States recruited from Survey Sampling International's (SSI) national opt-in panel. SSI panel members were recruited to participate in the current study through SSI's Dynamix sampling platform and email invitations. Respondents who completed the survey were compensated by SSI according to SSI's normal compensation options based on the length of the survey.

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[1] This research received funding support of the U.S. Food and Drug Administration through the National Cancer Institute (grant # P20CA095856-09S1), Dr. Robert Hornik (PI).

Respondents were eligible for the study if they were adults (ages 18+) who were current cigarette smokers: they reported having smoked at least 100 cigarettes in their lifetime and currently smoked every day (Centers for Disease Control and Prevention, 2011). Of 27,077 individuals who accepted the initial invitation to participate in the study, 48.2% (N = 13,053) smoked at least 100 cigarettes in their life, and of those 58.5% (N = 7,619) were regular daily smokers. Because the study in part sought to assess how responses to graphic warning labels differ among specific demographic groups, a non-proportional stratified sampling design was used to ensure that African-American and Hispanic respondents were oversampled relative to their representation in the population. Based on these demographic considerations, 4,890 individuals qualified for the study, and of those 3,694 (75%) completed the survey.

Research Design

This study was an online survey hosted by the Annenberg IT systems group at the University of Pennsylvania. Participants could complete the surveys on any computer with an internet connection. On average, the survey took 9.5 minutes to complete (*SD* = 7.3 minutes).

After providing consent and determining eligibility for the study, participants completed demographic items and answered questions regarding their current smoking behaviors. Following these items, participants were

randomly assigned to one of ten conditions in which they viewed either a graphic warning label or the standard text only warning label currently appearing on cigarette packs. These manipulations were not of primary interest for the present study and so differences in the outcomes across conditions, where they exist, were controlled for in the models but were not discussed here in detail.

After viewing each warning label image, participants answered items assessing their reactions to that label. After viewing three randomly selected labels, participants answered items assessing smoking cessation intentions and self-efficacy. Participants who completed the survey were thanked for their participation and re-routed to SSI's website for compensation.

Measures

Demographics. Respondent characteristics collected consisted of demographic characteristics including age, gender, race/ethnicity (recoded as African American, White, or Other), Hispanic origin (recoded as Hispanic or not), years of educational attainment, and income.

Smoking-related characteristics. Four smoking-related characteristics were collected: nicotine dependence, stage of change, number of quit attempts, and age at smoking initiation.

To measure the intensity of participants' physical dependence on nicotine, the Fagerström Test for Nicotine Dependence was used (FTND, Heatherton,

Kozlowski, Frecker, & Fagerstrom, 1991). The FTND had six items assessing: (a) number of cigarettes smoked per day, (b) how soon one smokes a cigarette after waking, (c) whether one smokes when they were ill, (d) ability to refrain from smoking in places where smoking was forbidden, (e) whether one considers the first cigarette of the day as the most difficult to give up, and (f) whether one smokes more frequently during the first hour after waking. A higher score on the scale indicates stronger physical dependence on nicotine.

Participant's level of readiness to quit smoking was measured according to the transtheoretical model (TTM; Prochaska & DiClemente, 1983) using a modified version of the Ladder of Contemplation (CL, Biener & Abrams, 1991). Participants were asked to choose a number between 0 and 10 indicating where they were in thinking about quitting smoking. Five numbers on the ladder were marked as points: 0 read 'I have no thoughts about quitting smoking'; 2 read 'I think I need to consider quitting smoking someday'; 5 read 'I think I should quit smoking but I'm not quite ready'; 8 read 'I am starting to think about how to reduce the number of cigarettes I smoke a day'; and 10 read 'I am taking action to quit smoking'. A higher score on the CL indicated greater interest in smoking cessation.

To measure past smoking cessation attempts, participants were asked how many times in the past twelve months they had stopped smoking for one

day or longer because they were trying to quit smoking. As well, participants were asked how old they were when they smoked their first whole cigarette.

Smoking-related self-concepts. The ASC and SSC were measured using abbreviated versions of previously validated scales (Shadel & Mermelstein, 1996). To determine the magnitude of identification with the SSC, participants were asked to indicate their level of agreement on a 5-point scale (0 = strongly disagree, 4 = strongly agree) with three items: ‘Smoking is a part of my self-image;’ ‘Smoking is part of my personality;’ and ‘I think of myself as someone who is a smoker.’ These three items were averaged into an overall score indicating identification with the SSC (α = .87).

To determine the magnitude of identification with the ASC, participants were asked to indicate their level of agreement on a 5-point scale (0 = strongly disagree, 4 = strongly agree) to three items: ‘I am able to see myself as a non-smoker’; ‘It was easy to imagine myself as a non-smoker’; and ‘I am comfortable with the idea of being a non-smoker.’ These items were averaged into a measure indicating overall identification with the ASC (α = .86).

Smoking cessation intentions. Individuals were asked to respond to three behavioral intention items on a 4-point scale (1 = definitely will not, 4 = definitely will). Items asked participants how likely it was in the next three months they would: try to quit smoking completely, reduce the number of cigarettes smoked in

a day, and call a smoking quit-line. These items were averaged into an overall measure of smoking cessation intentions (α = .81).

Smoking cessation self-efficacy. Self-efficacy to engage in smoking cessation behaviors was assessed with three items asking participants to indicate how sure they were that they could engage in behaviors in the next three months on a 4-point scale (1 = not at all sure, 4 = completely sure). Individuals reported their self-efficacy to: quit smoking completely, avoid smoking when they were craving a cigarette, and avoid smoking when they were around friends who were smoking. These items were averaged into an overall measure of smoking cessation self-efficacy (α = .86).

Analysis. The analysis tested the hypotheses that the ASC and the SSC were significantly associated with smoking cessation intentions and self-efficacy, and that these associations persist above those accounted for by other smoking-related characteristics. To test the hypotheses, the general linear model (GLM) fit using the method of least squares was used. Each model applied a GLM with a Gaussian response distribution. Where data were missing, list-wise deletion was used due to few missing values. Variables accounting for identification with the ASC and SSC were regressed onto smoking cessation intentions and self-efficacy. Next, mean-centered exogenous variables representing smoking-related characteristics and participant demographics were added to the models. The models were estimated using SAS Version 9.3.

Table 2. Study 1 participant characteristics

Variable	*M* (%)	*SD*	Min.	Max.
Age	34.44	14.37	18	99
Female (%)	55.3			
Black/ African-American (%)	34.3			
Hispanic/ Latino (%)	30.0			
Education (years)	13.06	2.18	0	18
Income (thousands of dollars)	41.37	33.95	12.5	175
FTND	4.71	2.26	0	10
CL	5.65	2.94	0	10
Quit attempts	3.08	7.48	0	99
Smoking initiation age	15.91	4.30	1	80
SSC	1.97	1.09	0	4
ASC	2.61	1.03	0	4
Reactance	2.59	.99	1	5
Smoking cessation self-efficacy	2.20	.95	1	4
Smoking cessation intentions	2.48	.78	1	4

Note: n = 3,637

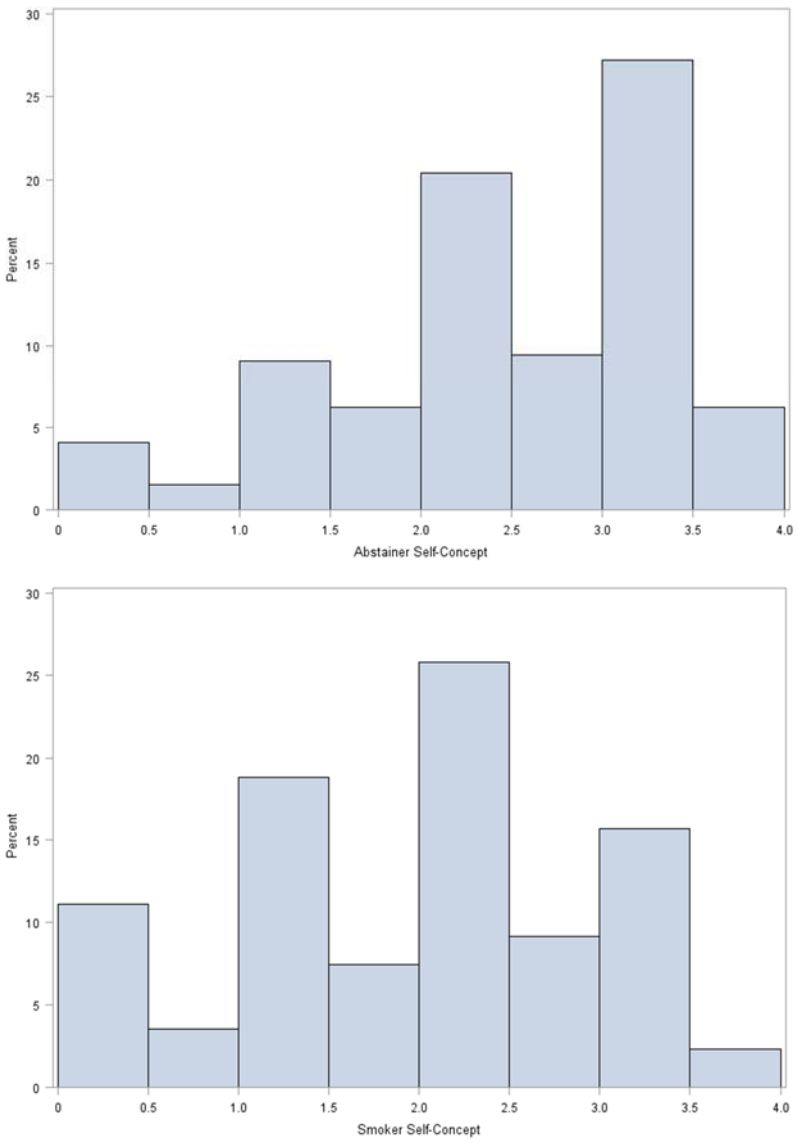
Results

Descriptive Results

Table 2 summarizes participant demographics and variables included in the models. The sample consisted of regular smokers between 18 and 79 years of age (*M* = 34.44, *SD* = 14.37). Participants were predominately female (55.3%) with representation among Hispanic (30.0%) and African-American (34.3%) participants. Participants completed an average of 13.06 years of education (*SD* = 2.18), and earned an average of 41.37 thousand dollars per year (*SD* = 33.95 thousand dollars).

Participants generally neither agreed nor disagreed that they identified with the SSC (*M* = 1.97, *SD* = 1.09) and agreed that they identified with the ASC (*M* = 2.61, *SD* = 1.03). Participants were on average at the midpoint of the FTND (*M* = 4.71, *SD* = 2.26) and CL (*M* = 5.65, *SD* = 2.94) and attempted to quit smoking in the past year on average 3.07 times (*SD* = 7.44). Participants initiated smoking at a median age of 16 years (*M* = 15.91, *SD* = 4.30). Participants most commonly reported that they were ‘not at all sure’ that they had self-efficacy to quit smoking (*M* = 2.20, *SD* = .95) and that they ‘probably will not’ engage in smoking cessation behaviors (*M* = 2.48, *SD* = .78)

Figure 2. Histograms of identification with ASC and SSC



The distributions of the ASC and SSC are graphically displayed in Figure 2. A visual inspection of the distributions suggests they approximate a normal distribution. The ASC appears to have a slight negative skew. To explore these distributions further, these variables were divided into categories representing those who disagreed (<2), were neutral (=2), or agreed (>2) that they identified with each self-concept. Individuals who disagreed that they identified with the SSC scored an average of .89 (*SD* = .58, *n* = 1,509) on the SSC scale, individuals who were neutral on their identification with the SSC scored 2 (*SD* = .00, *n* = 585), and individuals who agreed that they identified with the SSC scored an average of 2.98 (*n* = 1,600). Individuals who disagreed that they identified with the ASC scored an average of 1.06 (*SD* = .58, *n* = 771) on the ASC scale, individuals who were neutral on their identification with the ASC scored an average of 2 (*SD* = .00, *n* = 409), and individuals who agreed that they identified with the abstainer self-concept scored an average of 3.19 (*SD* = .57, *n* = 2,500). Based on this split, the cell sizes varied from 54 to 84.

Overall, about two-fifths participants (43.3%) agreed that they identified with the SSC and about two-thirds of participants (67.7%) agreed that they identified with the ASC. Table 3 summarizes the distributions of participants in these categories looking at the interaction of these two identities. One-third (31.7%) of respondents agreed that they identified with the ASC but disagreed that they identified with the SSC. Over one-tenth of participants (12.9%) were

agreed that they identified with the SSC but disagreed that they identified with the ASC. One quarter of respondents (25.8%) agreed that they identified with both the smoking-related self-concepts, and few (6.3%) participants identified with neither self-concept.

Table 3. Percent of participants by categorical identification with smoking-related self-concepts[2]

	ASC			
SSC	Disagree	Neutral	Agree	Total
Disagree	6.3	2.8	31.7	40.9
Neutral	2.1	3.6	10.2	15.8
Agree	12.9	4.6	25.8	43.3
Total	21.3	11.1	67.7	

Correlational Analyses

Correlations between identification variables and the other variables included in the models are summarized in Table 4. The ASC and SSC were significantly negatively correlated (r = -.21, p < .001). Individuals who more

[2] Because African-American participants were oversampled in this study, weighted means for these distributions were calculated. However, the weighted means were not substantively different from unweighted means, and thus for consistency with the subsequent studies, unweighted means are presented here.

strongly identified with the SSC were more dependent on nicotine, at lower stages of change along on the contemplation ladder to smoking cessation, and started smoking earlier in life; as identification with the SSC increased, participants reported higher scores on the FTND (r = .28, p < .001), lower scores on the CL (r = -.16, p < .001), and a younger smoking initiation age (r = -.07, p < .001). Individuals who identified more strongly with the ASC were less dependent on nicotine, were further along the contemplation ladder to smoking cessation, had tried to quit more times, and started smoking later in life; identification with the ASC was significantly correlated with lower scores on the FTND (r = -.20, p < .001), higher scores on the CL (r = .36, p < .001), more quit attempts (r = .12, p < .001), and an older smoking initiation age (r = .09, p < .001).

Identification with the ASC was significantly correlated with higher smoking cessation intentions (r = .40, p < .001) and greater smoking cessation self-efficacy (r = .34, p < .001). However, contrary to expectations, the bivariate correlation suggested that identification with the SSC was unrelated to smoking cessation intentions (r = .00, p = .90) and only weakly negatively related smoking self-efficacy (r = -.04, p = .03).

There was no evidence for systematic differences in identification with the smoking-related self-concepts based on participant demographics. One difference that emerged out of the data was that African-American participants

Table 4. Pearson's correlations and *p*-values between participant characteristics and smoking-related self-concepts

	SSC	ASC
ASC	-.21***	--
Cessation self-efficacy	-.04*	.34***
Cessation intentions	.00	.40***
FTND	.28***	-.20***
CL	-.16***	.36***
Quit Attempts	-.02	.12***
Smoking Initiation Age	-.07***	.09***
Education years	.07***	.06***
Income	.13***	.04*
Age	-.02	.00
Hispanic	.03	.00
Black/African American	-.09***	.12***
Male	.14***	-.05***

Note. n = 3,637. *p < .05; *** p < .001.ASC

identified less strongly with the SSC (r = -.09, p < .001) and identified more strongly with the ASC (r = .12, p < .001). The impact of race on identification was important for this study due to the large percentage of African-American participants and the correlation between race and the determinants of smoking

cessation. Thus, controls for race were included in all the models evaluated, though inclusion of race did not substantively change the results.

Smoking cessation self-efficacy

It was predicted that as respondents identified more strongly with the ASC, smoking cessation self-efficacy would be higher. It was predicted that as respondents identified more strongly with the SSC, smoking cessation self-efficacy would be lower. Table 5 summarizes the results of the GLMs modeling the relationship between smoking cessation self-efficacy and identification with the smoking-related self-concepts.

Table 5, model 1 summarizes the results of the GLM where identification with the ASC was regressed onto smoking cessation self-efficacy, with study condition and race as controls. As predicted, identification with the ASC was positively associated with smoking cessation self-efficacy and explained 11.5% of the variance in this outcome.

Table 5, model 2 summarizes the results of the GLM where identification with the SSC was regressed onto smoking cessation self-efficacy, with study condition and race as controls. Though the relationship between identification with the SSC and smoking cessation self-efficacy was negative and thus in the expected direction, this relationship was not significant.

Table 5. Estimated coefficients of general linear models predicting smoking cessation self-efficacy (standard errors in parentheses)

	Model 1	Model 2	Model 3	Model 4
Variables	*B (se)*	*B (se)*	*B (se)*	*B (se)*
ASC	.30***		.32***	.24***
	(.01)		(.01)	(.02)
SSC		-.03	.03*	.03
		(.01)	(.01)	(.01)
FTND				.01
				(.01)
CL				.06***
				(.01)
Quit Attempts				.01***
				(.00)
Smoking Initiation Age				.01**
				(.00)
Age				-5.1×10^{-3}***
				(1.0×10^{-3})
Female				-.12***
				(.03)
Black	.12***	.19***	.12***	.12***

	(.03)	(.03)	(.03)	(.03)
Hispanic				.04
				(.03)
Education				.01
				(.01)
Income				1.7×10^{-3}***
				(4.5×10^{-5})
Intercept	1.44***	2.33***	1.36***	1.52***
	(.06)	(.06)	(.07)	(.08)
Adjusted R^2	.115	.010	.117	.197
F value	159.43***	12.99***	121.28***	68.23***

Note. n = 3,637. *p < .05;** p < .01; *** p < .001. Control in all models is study condition.

Table 5, model 3 in shows the results where identification with both smoking-related self-concepts are included. The effect of identification with the ASC on smoking cessation self-efficacy remains positive and significant, and the effect of identification with the SSC on smoking cessation self-efficacy becomes slightly positive and significant.

Table 5, model 4 summarizes the results of the GLM once mean-centered exogenous smoking-related variables and demographics are added to the

equation. While the exogenous variables in the model account for a significant portion of the variance, the effect of identification with the ASC on smoking cessation self-efficacy remains significantly positive. The effect of identification with the SSC is no longer significant suggesting that the smoking-related and demographic variables explain the effects observed in model 3.

Smoking cessation intentions

It was predicted that as respondents identified more strongly with the ASC, smoking cessation intentions would be higher. It was predicted that as respondents identified more strongly with the SSC, smoking cessation intentions would be lower. Table 6 summarizes the results of the GLMs modeling the relationship between smoking cessation intentions and identification with the smoking-related self-concepts.

Table 6, model 1 summarizes the results of the GLM where identification with the ASC is regressed onto smoking cessation intentions, with study condition and race as controls. As predicted, the results suggested that identification with the ASC had a significant positive association with smoking cessation intentions and explained 16.6% of the variance in this outcome.

Table 6. Estimated coefficients of GLMs predicting smoking cessation intentions (standard errors in parentheses)

	Model 1	Model 2	Model 3	Model 4
Variables	*B (se)*	*B (se)*	*B (se)*	*B (se)*
ASC	.29***		.30***	.19***
	(.01)		(.01)	(.01)
SSC		.01	.07***	.08***
		(.01)	(.01)	(.01)
FTND				.04***
				(.00)
CL				.12***
				(.00)
Quit Attempts				.01***
				(.00)
Smoking Initiation Age				3.4×10^{-3}
				(2.4×10^{-4})
Age				-2.3×10^{-3}***
				(7.2×10^{-4})
Female				-.02
				(.02)
Black	.18***	.25***	.19***	.17***

	(.02)	(.03)	(.02)	(.02)
Hispanic				.06*
				(.02)
Education				.01
				(.00)
Income				1.4×10^{-5}
				(3.2×10^{-5})
Intercept	1.81***	2.60***	1.64***	1.91***
	(.05)	(.05)	(.06)	(.06)
Adjusted R^2	.166	.024	.175	.395
F value	244.15***	29.84***	195.38***	182.23***

Note. n = 3,643. *p < .05; *** p < .001. Control in all models is study condition.

Table 6, model 2 summarizes the results of the GLM where identification with the SSC is regressed onto smoking cessation intentions, with study condition and race as controls. The results did not provide evidence that the SSC had a significant relationship with smoking cessation intentions.

Table 6, model 3 shows the results where identification with both the SSC and ASC is included. The effect of identification with the ASC on smoking cessation intentions remains positive and significant, and the effect of identification with the SSC on smoking cessation intentions becomes slightly positive and significant.

Table 6, model 4 summarizes the results of the GLM once mean-centered exogenous smoking-related variables and demographics are added to the equation. Though explained in part by the demographic and smoking-related variables, the effect of identification with the ASC on smoking cessation intentions remains significantly positive. The effect of identification with the SSC remains slightly positive and significant. However, the lack of evidence for this latter relationship in the bivariate correlations suggested that this observed association must be interpreted with caution.

Discussion

This study shows that smokers identify with the ASC and SSC to varying degrees, and these self-concepts are important regulators of smoking and smoking cessation behaviors. For most smokers, the smoking-related self-concepts are part of their self-definition. Identification with these self-concepts has an inverse relationship such that as participants identify more strongly with one self-concept (e.g. ASC), they identify less strongly with the other self-concept (e.g. SSC). In addition, the smoking-related self-concepts have associations with other smoking-related characteristics such as nicotine addiction and stage of change toward smoking cessation. Though these self-concepts are associated with each other and with other smoking-related characteristics, these associations are moderate and thus identification with the ASC and SSC is not fully explained by these relationships. These results provide evidence that the

ASC and SSC have unique contributions to smoking behaviors, and that identification with the ASC contributes to smoking cessation behaviors.

This study validates the findings of previous research that identification with the ASC is an important individual difference variable in the determinants of smoking cessation. There is consistent and strong evidence that those who are able to imagine themselves as non-smokers have higher smoking cessation intentions and self-efficacy. As individuals identify more strongly with the ASC, they are more likely to intend to quit smoking and to feel confident in their ability to do so. These relationships persist above and beyond controls for behavioral and demographic variables, suggesting that identification with the ASC has a unique contribution to motivating smoking cessation behaviors.

Although these findings are correlational and thus must be interpreted with caution, these results are compelling because they suggest that the ASC may play a motivational role in these determinants of smoking cessation. It may be possible to increase smoking cessation intentions and self-efficacy by increasing participants' identification with the ASC. In addition, it may be possible to increase smoking cessation intentions and self-efficacy by increasing the salience of the ASC as a motivator of the determinants of smoking cessation through media priming.

The relationship between the SSC and the determinants of smoking cessation in this study is not as clear. Identification with the SSC is not correlated with smoking cessation intentions, yet the relationship between the SSC and smoking cessation intentions is positive when other smoking-related characteristics and demographics are controlled in a GLM. The SSC has a significant negative correlation with smoking cessation self-efficacy, as expected; however, the GLM models do not provide evidence of this association. Thus, this study suggests that the SSC does not have a significant or consistent role in smoking cessation behaviors.

There are several explanations for the lack of effects of the SSC. First, the SSC may play a relatively small role in guiding smoking cessation behaviors as compared to its counterpart, the ASC. The ASC may exert a strong influence on the determinants of smoking cessation and thus preempt the SSC from exerting an influence on these outcomes. In addition, the smokers may respond to items assessing their smoking cessation intentions and self-efficacy in a predetermined way, regardless of their level of identification with the SSC. Finally, the SSC may have a non-linear effect on these outcomes, not explored in this study. Further analysis is needed to evaluate these potential outcomes.

In addition, this study is a secondary cross-sectional analysis of data generated from an experiment. Participants in this study were exposed to cigarette packages with graphic warning labels after they reported their level of

identification with the SSC and ASC, but before the determinants of smoking cessation were measured. It may be that the intervention in this study impacted the relationship between the SSC and the determinants of smoking cessation. For example, this intervention may have brought the ASC to mind, and thus obscured the relatively weak influence of the SSC. In the absence of the intervention, it may be that the SSC has the expected associations with the determinants of smoking cessation. Because self-concepts are thought to function differently in different domains, it may be that within the context of this study, the SSC was not part of the working self-concept that influenced smoking cessation intentions and self-efficacy. Due to the design of this study, there is no way to disentangle the effects of the manipulation from the relationship between the SSC and the determinants of smoking cessation.

Though the SSC outcomes are unexpected, they confirm the findings of Shadel and Mermelstein (1996) in their study of smokers enrolled in a smoking cessation treatment intervention. The authors failed to find a main effect of identification with the SSC at the start of the treatment on smoking cessation success three months later. As in this study, the smokers were exposed to a smoking cessation treatment program between the measures identification with the SSC and the outcomes.

However, these outcomes contrast with other findings that increased identification with the SSC undermines smoking cessation intentions (Falomir &

Invernizzi, 1999). This study differs from this previous research in terms of its measures and sample. Falomir and Invernizzi (1999) used a SSC scale which included a measure of social identification (e.g. “to what extent to you identify with smokers”). The scale used in the present study did not include measures of social identification and instead focused on participants’ agreement that being a smoker is part of one self (e.g. smoking is part of who I am”). Social identification with other smokers may have a negative relationship with the determinants of smoking cessation that is distinct from the SSC as conceptualized in this study. For example, identifying with other smokers may represent a normative influence on behavior (e.g. my friends all smoke, so I should smoke), rather than knowledge about the self (e.g. I am a smoker). In addition, Falomir and Invernizzi (1999) used a population of Spanish speaking high school students (mean age = 16.7 years), as compared to this study which used a population of English speaking adult smokers (mean age = 34.4 years). It may be that the SSC has a stronger effect on younger individuals for whom current self-identities may have a stronger relationship with their behaviors, and who are more influenced by normative pressures.

The findings of this study suggest that smoking cessation messages designed to specifically target the ASC through persuasion or priming could be effective at motivating smoking cessation behavior. However, there is no evidence that decreasing identification with the SSC has any clear advantages.

Yet, the evidence in this study is not enough to draw conclusions as to the role of the SSC in the population. These unexpected findings are contrary to prior research and therefor warrant further exploration in the subsequent studies. In addition, it is important to assess whether messages may inadvertently prime the SSC, decreasing their effectiveness. The next studies aim to develop messages that can impact the ASC, without inadvertently priming the SSC or increasing identification with this self-concept.

CHAPTER 3 STUDY 2 (Pilot 1, Part 1)

Pilot 1 is a randomized web-based experiment with four conditions: (1) *ASC Frame* (2) *SSC Frame* (3) *PVQ*, and (4) *Control*. Pilot 1 accomplished three broad goals. Part 1 of Pilot 1 (Study 2, discussed here) evaluates whether messages with ASC and SSC frames increase identification with and prime the ASC and SSC. Part 2 of Pilot 1 (Study 3) describes smokers' value priority rankings and to examines whether value priority rankings differ by level of identification with the SSC and ASC. These outcomes are discussed in Chapter 4. Part 3 of Pilot 1 (Study 4) evaluates messages with content related to values to determine whether these messages adequately express their target values. These outcomes are discussed in Chapter 5.

In the present study, ASC and SSC frame versions of the messages are compared to a *Control* condition to evaluate their persuasive and priming effects. The aims of the study are twofold. First, this study assesses whether messages with ASC and SSC frames increase identification with and prime the ASC. In addition, this study assesses whether these messages inadvertently increase identification with the SSC or prime this construct. The hypotheses evaluated in this study are:

Hypothesis 3a: Compared to the *Control* condition, within-person changes in the mean level of identification with the ASC will be higher in the *ASC Frame*

condition. There will be no evidence that the *SSC Frame* condition affects the mean level of identification with the ASC as compared to the *Control* condition.

Hypothesis 3b: Compared to the *Control* condition, within-person changes in the mean level of identification with the SSC will be lower in the *SSC Frame* condition. There will be no evidence that the *ASC Frame* condition affects the mean level of identification with the SSC as compared to the *Control* condition.

Hypothesis 4: Compared to the *Control* condition, the beta weight of the ASC on smoking cessation intentions and self-efficacy will be higher in the *ASC Frame* condition. There will be no evidence that the *SSC Frame* condition affects the beta weight of the ASC on smoking cessation intentions and self-efficacy as compared to the *Control* condition.

Because the previous study suggested that the SSC does not have a significant or consistent role in smoking cessation behaviors, in addition to these hypotheses, it was expected that that the data would not provide evidence against the null hypotheses that the strength of association between the SSC and the determinants of smoking cessation is affected by the study conditions as compared to the *Control* condition.

Method

Participants

Data for this study was collected during May 2014. The study used a sample of English-speaking American smokers ages 18 and over recruited through the Amazon Mechanical Turk (MTurk) web service. Participants were recruited through a Human Intelligence Task (HIT) posted to MTurk. Participants who qualified and completed the study were offered a modest compensation.

Respondents were eligible for the study if they were adults (ages 18+) who were current cigarette smokers: they reported having smoked at least 100 cigarettes in their lifetime and currently smoked every day (Centers for Disease Control and Prevention, 2011). Of 5,187 individuals accepted the HIT and began the survey, 51.1% (n = 2,653) smoked at least 100 cigarettes in their life. Of those, 32.5% (n = 862) were regular daily smokers and thus qualified for the study. Of the qualified participants, 95.9% (n = 827) completed the survey.

Research Design

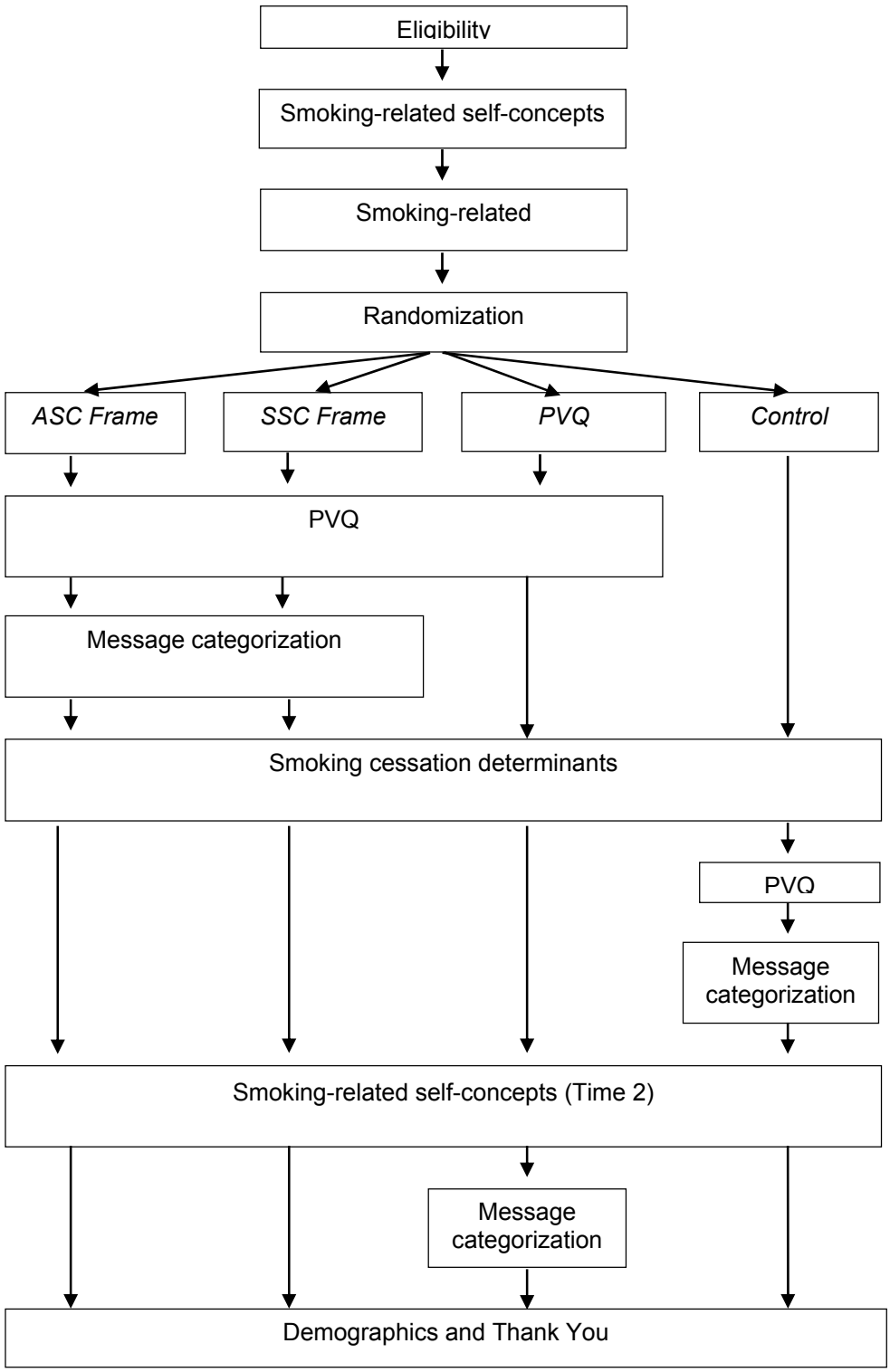
This study was part of an online experiment hosted by Qualtrics, LLC. Participants could complete the study on any computer with an internet connection. On average, the entire study took an average of 13.4 minutes to complete (*SD* = 5.2 minutes). After providing consent and determining eligibility for the study, participants answered items assessing their gender, the degree to

which they identified with the ASC and SSC, and their smoking-related characteristics. Next, participants were randomly assigned to one of four conditions: (1) *ASC Frame* (2) *SSC Frame*, (3) *PVQ*, and (4) *Control*. Figure 3 shows a schematic of the flow of the study for all conditions.

The study included four parts, the order of which varied based on study condition: (a) PVQ (described in detail in Chapter 4), (b) a message categorization task (described in detail in Chapter 5) where participants viewed messages with either an ASC or SSC frame (c) measures of smoking cessation intentions and self-efficacy, and (d) time two measures of identification with the ASC and SSC.

Participants in the *SSC Frame*, *ASC Frame,* and *PVQ* conditions first completed the PVQ, an instrument assessing their value priorities. Next, participants in the *SSC Frame* and *ASC Frame* conditions completed the message categorization task and answered items assessing their smoking cessation intentions, smoking cessation self-efficacy, and identification with the ASC and SSC. Participants in the *PVQ* condition answered smoking cessation self-efficacy, smoking cessation intentions, and identification with the ASC and SSC items directly after completing the PVQ; and then completed the message categorization task.

Figure 3. Schematic of Study 2



Participants in the *Control* condition answered smoking cessation intentions and self-efficacy items first, and then completed the PVQ and the message categorization task, which they were randomly assigned to view with either ASC or SSC frame. They then answered items assessing identification with the ASC and SSC.

After these sections, all participants answered demographic items and were thanked for their participation in the study.

Messages

Two value-expressive messages were generated for each motivational type of value, except for conformity and tradition which were grouped together into one message due to their content overlap. The messages were derived from the pro-smoking-cessation arguments presented on quit smoking support groups on the internet, namely quitsmoking.about.com. As an introduction to these messages participants were told that, “These negative (positive) comments about being (becoming) a smoker (non-smoker) were collected from other people like you.” A full list of the messages evaluated in this study is presented in Table 7.

Table 7. Messages and corresponding values

Value	ASC Frame (As a non-smoker…)	SSC Frame (As a smoker…)
Benevolence	I will inspire my friends and family who smoke to quit. I can help them quit smoking.	I prevent my friends and family who smoke from quitting. I make it harder for them quit smoking.
	I will be more honest with people because there were no longer times when I feel I have to hide my habit.	I am not honest with people because there were times when I feel I have to hide my habit.
Universalism	I will not create cigarette butts from which toxic chemicals pollute the earth.	I create cigarette butts from which toxic chemicals pollute the earth.
	I will no longer be supporting the tobacco industry in enslaving people around the world to nicotine addiction.	I am supporting the tobacco industry in enslaving people around the world to nicotine addiction.
Self-Direction	I will be in control of ME.	I am not in control of ME.

Value	ASC Frame (As a non-smoker…)	SSC Frame (As a smoker…)
	I will no longer be an addict controlled by the substance I'm addicted to.	I am an addict controlled by the substance I'm addicted to.
Stimulation	I will be able to have new experiences without having to stress about where and when I would be able to smoke.	I am not able to have new experiences without having to stress about where and when I will be able to smoke.
	I will get to experience the thrill of the changes being a non-smoker will bring to my life.	I don't get to experience the thrill of the changes being a non-smoker could bring to my life.
Hedonism	When I eat a delicious meal I will be able to actually taste it.	When I eat a delicious meal I am not able actually taste it.
	I will enjoy the pleasure that knowing I was able to quit brings to my life.	I cannot enjoy the pleasure that knowing I am able to quit would bring to my life.
Achievement	I will have respect for myself and I will feel proud.	I don't have respect for myself and I feel ashamed.

Value	ASC Frame (As a non-smoker…)	SSC Frame (As a smoker…)
	I'll grow stronger with every smoke-free day.	I'm growing weaker with every day I smoke.
Power	I will have more cash in my pocket to buy myself nice things.	I have less cash in my pocket to buy myself nice things.
	I will be able to give advice and influence friends and family members who I think should quit.	I am not able to give advice and influence friends and family members who I think should quit.
Security	I will be able to laugh without having a coughing fit and climb stairs without getting winded.	I can't laugh without having a coughing fit or climb stairs without getting winded.
	My house will no longer be dirty with ashtrays and my clothes will no longer be dirty from the smell of cigarette smoke.	My house was dirty with ashtrays and my clothes were dirty from the smell of cigarette smoke.

Value	ASC Frame (As a non-smoker…)	SSC Frame (As a smoker…)
Conformity/ tradition	I will not have to sneak away to smoke and hide my habit from people who think smoking was wrong.	I have to sneak away to smoke and hide my habit from people who think smoking was wrong.
	I will have self-control over my desire to smoke cigarettes.	I don't have self-control over my desire to smoke cigarettes.

Messages in an ASC frame emphasized the positive and aspirational aspects of the self as a non-smoker in the future, defined by being able to "see myself as a non-smoker." For example, an ASC frame message focusing on the value of hedonism stated, "As a non-smoker when I eat a delicious meal I will be able to actually taste it." Messages with a SSC frame emphasized the negative aspects of a present self as a smoker defined by smoking being part of "who I am." For example, the hedonism expressive message with a SSC frame stated: "As a smoker when I eat a delicious meal I am not able to actually taste it."

Measures

Demographics. Respondent characteristics collected consisted of demographic characteristics including age, gender, race/ethnicity (recoded as

African American, White, or Other), Hispanic origin (recoded as Hispanic or not), years of educational attainment, and income.

Smoking-related characteristics. Four smoking-related characteristics were collected: nicotine dependence, stage of change, number of quit attempts, and age at smoking initiation.

To measure the intensity of participants' physical dependence on nicotine, the Fagerström Test for Nicotine Dependence was used (FTND, Heatherton et al., 1991). The FTND had six items assessing: (a) number of cigarettes smoked per day, (b) how soon one smokes a cigarette after waking, (c) whether one smokes when they were ill, (d) ability to refrain from smoking in places where smoking was forbidden, (e) whether one considers the first cigarette of the day as the most difficult to give up, and (f) whether one smokes more frequently during the first hour after waking. A higher score on the scale indicates stronger physical dependence on nicotine.

Participant's level of readiness to quit smoking was measured according to the transtheoretical model (TTM; Prochaska & DiClemente, 1983) using a modified version of the Ladder of Contemplation (CL, Biener & Abrams, 1991). Participants were asked to choose a number between 0 and 10 indicating where they were in thinking about quitting smoking. Five numbers on the ladder were marked as points: 0 read 'I have no thoughts about quitting smoking'; 2 read 'I

think I need to consider quitting smoking someday'; 5 read 'I think I should quit smoking but I'm not quite ready'; 8 read 'I am starting to think about how to reduce the number of cigarettes I smoke a day'; and 10 read 'I am taking action to quit smoking'. A higher score on the CL indicated greater interest in smoking cessation.

To measure past smoking cessation attempts, participants were asked how many times in the past twelve months they had stopped smoking for one day or longer because they were trying to quit smoking. As well, participants were asked how old they were when they smoked their first whole cigarette.

Smoking-related self-concepts. The ASC and SSC were measured using abbreviated versions of previously validated scales (Shadel & Mermelstein, 1996). To determine the magnitude of identification with the SSC, participants were asked to indicate their level of agreement on a 5-point scale (0 = strongly disagree, 4 = strongly agree) with three items: 'Smoking is a part of my self-image;' 'Smoking is part of my personality;' and 'I think of myself as someone who is a smoker.' These three items were averaged into an overall score indicating identification with the SSC measured at the start of the study (α = .84), and again later in the study (α = .88), with the exact location being determined by study condition.

To determine the magnitude of identification with the ASC, participants were asked to indicate their level of agreement on a 5-point scale (0 = strongly disagree, 4 = strongly agree) to three items: 'I am able to see myself as a non-smoker'; 'It was easy to imagine myself as a non-smoker'; and 'I am comfortable with the idea of being a non-smoker.' These items were averaged into a measure indicating overall identification with the ASC (α = .82), and again later in the study (α = .87), with the exact location being determined by study condition.

Smoking cessation intentions. Individuals were asked to respond to three behavioral intention items on a 4-point scale (1 = definitely will not, 4 = definitely will). Items asked participants how likely it was in the next three months they would: try to quit smoking completely, reduce the number of cigarettes smoked in a day, and call a smoking quit-line. These items were averaged into an overall measure of smoking cessation intentions (α = .71).[3]

Smoking cessation self-efficacy. Self-efficacy to engage in smoking cessation behaviors was assessed with three items asking participants to indicate how sure they were that they could engage in behaviors in the next three months on a 4-point scale (1 = not at all sure, 4 = completely sure). Individuals reported their self-efficacy to: quit smoking completely, avoid smoking when they

[3] "Calling a quit-line" had a low correlation with the mean intention score (*r* = .34), leading to a suppression of the overall α of the scale. All the models presented here were evaluated using a two item intention scale with this item excluded. However, the results of these models were not significantly different and so for ease of comparability to the other studies, the three item scale is presented here.

were craving a cigarette, and avoid smoking they were around friends who were smoking. These items were averaged into an overall measure of smoking cessation self-efficacy (α = .80).

Analysis

The analysis tested hypotheses related to priming effects and persuasion effects of the message frames. All analysis was conducted using SAS Version 9.3.

Priming effects. Priming effects of the study conditions were assessed by examining the strength of association between the smoking-related self-concepts and the determinants of smoking cessation (Fishbein & Yzer, 2003). A GLM was fit with each of the determinants of smoking cessation as the outcome and a categorical variable representing study condition as the independent variable. To determine whether study condition significantly influenced the strength of association between smoking-related self-concepts and each of the determinants of smoking cessation, interaction terms between the ASC or SSC and the manipulation conditions were included in the model.

Persuasion effects. To examine the persuasion effects of the framed messages on mean changes in identification with the ASC and SSC, repeated-measures ANOVA evaluated changes in participants' identification with the ASC and SSC within subjects before and after exposure to the messages, and

between subjects in the different study conditions. Correlations among measurements for each individual were modeled through the specification of a covariance structure. For this analysis, the *PVQ* condition was the comparison condition. The *PVQ* condition only differed from the *ASC Frame* and *SSC Frame* conditions in terms of whether or not participants were exposed to the manipulation (see Figure 3). The *Control* condition involved intervening activities between the measures (e.g. PVQ), and so was not directly comparable to the other conditions and was excluded from this analysis.

Results

Descriptive Results

Among qualified participants who completed the survey, 21 respondents did not have a match between their reported year of birth and their age and as a quality control measure were excluded from the analysis. Thus, a total of 806 participants were included in the sample for this study.

The distribution of demographics and variables among participants who completed the study were summarized in Table 8. The sample consisted of regular smokers between 18 and 74 years of age (M = 34.23, SD = 10.66). Participants were predominately female (54.7%) with representation among Hispanic (6.7%) and African-American (7.6%) participants. Participants

completed an average of 14.26 years of education (*SD* = 1.93), and earned an average of 42.61 thousand dollars per year (*SD* = 30.79 thousand dollars).

Table 8. Pilot 1 (Study 2, 3 & 4) participant characteristics

Variable	*M* (%)	*SD*	Min.	Max.
Age	34.23	1.66	18	74
Female (%)	54.7			
Black/ African-American (%)	7.6			
Hispanic/ Latino (%)	6.7			
Education (years)	14.26	1.93	0	18
Income (thousands of dollars)	42.61	30.80	12.5	175
FTND	4.24	2.29	0	10
CL	5.87	2.55	0	10
Quit attempts	2.15	5.72	0	99
Smoking initiation age	15.73	3.61	6	41
SSC (Time 1)	1.96	.98	0	4
ASC (Time 1)	2.19	1.00	0	4
SSC (Time 2)	1.78	1.04	0	4
ASC (Time 2)	2.40	1.02	0	4
Smoking cessation self-efficacy	2.04	.86	1	4
Smoking cessation intentions	2.55	.85	1	5

Note: *n* = 806

Participants generally neither agreed nor disagreed that they identified with the SSC (M = 1.96, SD = .98) and generally neither agreed nor disagreed that they identified with the ASC (M = 2.19, SD = 1.00). Participants were on average at the midpoint of the FTND (M = 4.24, SD = 2.29) and CL (M = 5.87, SD = 2.55) and attempted to quit smoking in the past year between 0 and 99 times (M = 2.15, SD = 5.72). Participants initiated smoking at a median age of 16 years (M = 15.73, SD = 3.61). Participants most commonly reported that they were 'a little sure' that they had self-efficacy to quit smoking (M = 1.78, SD = 1.04) and that they 'probably will not' engage in smoking cessation behaviors (M = 2.40, SD = 1.02).

Table 9. Percent of participants by categorical identification with smoking-related self-concepts

	ASC			
SSC	Disagree	Neutral	Agree	Total
Disagree	9.1	3.7	31.4	44.2
Neutral	3.6	1.4	6.1	11.0
Agree	24.6	4.7	15.5	44.8
Total	37.2	9.8	53.0	

To explore the distribution of identification with the ASC and SSC in this sample, these variables were divided into categories representing those who disagreed (<2), were neutral (=2), or agreed (>2) that they identified with each self-concept. Table 9 summarizes these distributions. Similar to the findings in the previous study, there were roughly equal numbers of respondents who agreed and disagreed that they identified with the SSC. The majority (31.4%) of respondents agreed that they identified with the ASC and disagreed that they identified with the SSC. Yet, compared to the previous study, the population in this study identified less strongly with the ASC on average (*M* = 2.19 vs *M* = 2.61); only half (53.3%) of participants were agreed that they identified with the ASC, compared to two-thirds (67.7%) in Study 1.

Participants in this study were less likely to agree that identified with both smoking-related self-concepts simultaneously .Only 15.5% were agreed that they identified with both the ASC and SSC as compared to 25.8% in the previous study, and about one-quarter (24.6%) agreed that they identified with the SSC but disagreed that they identified with the ASC, as compared to 12.9% in the previous study.

Table 10. Pearson's correlations and *p*-values between participant characteristics and smoking-related self-concepts

	SSC	ASC
Abstainer self-concept	-.43***	
Cessation self-efficacy	-.22***	.40***
Cessation intentions	-.18***	.40***
FTND	.20***	-.22***
CL	-.22***	.42***
Quit Attempts	-.02	.13***
Smoking Initiation Age	-.06	.04
Education years	-.01	-.02
Income	-.03	.00
Age	.03	-.08*
Hispanic	-.02	.02
Black/African American	.01	.04
Male	.06	.07*

Note. n = 3,637. *p < .05; *** p < .001.

Correlational Analyses

Correlations between identification variables and the other variables included in the models are summarized in Table 10. The ASC and SSC were significantly negatively correlated (r = -.43, p < .001).

Individuals who more strongly identified with the SSC tended to be more dependent on nicotine and at lower stages of change along on the contemplation ladder to smoking cessation. As identification with the SSC increased, participants reported higher scores on the FTND (r = .20, p < .001) and lower scores on the CL (r = -.22, p < .001). Individuals who identified more strongly with the ASC were less dependent on nicotine, were further along the contemplation ladder to smoking cessation, and had tried to quit more times. Identification with the ASC was significantly correlated with lower scores on the FTND (r = -.22, p < .001), higher scores on the CL (r = .42, p < .001), and more quit attempts (r = .13, p < .001).

In line with the findings of Study 1, individuals who identified more with the ASC had significantly higher smoking cessation self-efficacy (r = .40, p < .001) and intentions (r = .40, p < .001). However, unlike the findings from Study 1 which found not relationship between the SSC and the determinants of smoking cessation, in the present study those who identified more with the SSC had significantly lower smoking cessation self-efficacy (r = -.22, p < .001) and intentions (r = -.18, p < .001).

To evaluate whether these relationships persisted when accounting for other smoking-related characteristics, a GLM was fit using the method of least squares with ASC, SSC, and mean-centered exogenous variables representing smoking-related characteristics and participant demographics regressed onto

smoking cessation intentions and self-efficacy. These models (Tables A39 and A40 in Appendix F) demonstrate that even when other predictors of smoking cessation outcomes are included, identification with the ASC continues to be significantly related to smoking cessation self-efficacy (B = .28, p < .001) and intentions (B = .15, p < .001). However, the relationship between the SSC and these outcomes is not supported. There is no evidence that the SSC is related to either smoking cessation self-efficacy (B = -.04, *ns*) or intentions (B = 1.72 x 10^{-3}, *ns*).

Persuasion effects

To assess persuasion effects, changes in identification with the ASC were assessed based on study condition. The model evaluated the prediction that within-person changes in identification with the ASC would be higher in the *ASC Frame* condition but not in the *SSC frame* condition as compared to the *PVQ* condition (i.e. the control condition for this analysis). The interaction of the *ASC Frame* condition and time describes the changes in the ASC between measurement occasions. If persuasive effects occurred, the coefficient for this interaction should be significantly different from the coefficient for the interaction between the *PVQ* condition and time. However, the coefficient for the interaction between the *SSC Frame* condition and time was not expected to be significant.

The first model in Table 11 summarizes the changes in identification with the ASC based on condition. The positive coefficient for time suggested that in

the *PVQ* (i.e. control) condition, identification with the ASC increased over time. However, compared to the *PVQ* condition this increase was not significantly different in the *ASC Frame* condition or in the *SSC Frame* condition. Thus, identification with the ASC increased in all the study conditions over time but there was no evidence that persuasion effects occurred. The increased identification with the ASC change was not significantly different based on study condition.

The second model in Table 11 summarizes changes in identification with the SSC based on condition. Mirroring the results above, the model suggested that identification with the SSC decreased over time. Yet, there was no evidence that the *SSC Frame* condition impacted this relationship. Interestingly, the coefficient for the interaction between time and the *ASC Frame* condition was negative and marginally significant ($p = .062$). This result indicated that identification with the SSC decreased more in the *ASC Frame* condition than in the *PVQ* condition. Though the interaction failed to reach significance at a $p < .05$ level, this outcome provided some initial evidence respondents' identification with the SSC decreased more after exposure to an ASC frame message as compared to the decrease in identification with the SSC in a no-message control condition.

Table 11. Estimated coefficients of ANOVA predicting within and between person changes in smoking-related self-concepts from study condition (standard errors in parentheses)

	ASC	SSC
Fixed Effects	*B (se)*	*B (se)*
Time	.25***	-.15***
	(.04)	(.04)
Time*ASC Frame	-.08	-.10†
	(.06)	(.05)
Time* SSC Frame	-.03	-.05
	(.06)	(.05)
Time* PVQ (Control)	--	--
Condition		
ASC Frame	.21*	-.01
	(.10)	(.10)
SSC Frame	.07	-.05
	(.10)	(.10)
PVQ (Control)	--	--
Intercept	3.07***	2.97***
	(.07)	(.07)
Random Effects (Variance Components)		

Between- individuals	.86***	.87***
	(.05)	(.05)
Time (within-	.15***	.15***
individuals)	(.01)	(.01)
Fit Statistics		
-2 Log Likelihood (*df*)	2681.6	2667.1
	(14)	(14)
AIC	2697.6	2683.1

Note. *N* = 1,212 (606 respondents * 2 times). Entries were fixed effects estimates where random effects estimate a compound symmetric covariance structure. † $p < .08$, * $p < .05$, *** $p < .001$

Priming Effects

Priming the ASC. It was predicted that the *ASC Frame* conditions would prime the relationship between the ASC and the determinants of smoking cessation, but that the *SSC Frame* conditions would not have priming effects. Pearson's product moment correlation coefficients between the ASC and each of the determinants of smoking cessation are presented in Table 12, sorted by study condition.

Table 12. Pearson's correlations between determinants of smoking cessation and the ASC within study conditions

	ASC Frame *n = 234*	*SSC Frame* *n = 239*	*PVQ* *n = 248*	*Control* *n = 256*
Intentions	.46	.38	.41	.35
Self-Efficacy	.48*	.38	.46	.30

Note. * $p < .05$, for comparison between each condition and the C*ontrol* condition using Fisher Z transformations.

Correlations suggested that the ASC had a strong significant relationship with intentions and self-efficacy in the *Control* condition. Fisher Z transformations evaluated the significance of the differences between the coefficients for each condition and the *Control* condition. There was a significant increase in the correlation between the ASC and smoking cessation self-efficacy in the *ASC Frame* condition, suggesting that priming effects occurred.

To evaluate the significance of the priming effects of the message frames on the ASC, the beta weights of the ASC on the determinants of smoking cessation were compared between each of the study conditions and the *Control* condition within the framework of a GLM. Table 13 summarizes these outcomes.

Table 13. Estimated coefficients of GLM predicting determinants of smoking cessation from the ASC and study condition (standard errors in parentheses)

	Intentions	Self-Efficacy
Variables	*B (se)*	*B (se)*
ASC	.29***	.21***
	(.05)	(.05)
ASC x ASC Prime	.11	.18*
	(.08)	(.07)
ASC x SSC Prime	.03	.14
	(.08)	(.08)
ASC x PVQ	.07	.23**
	(.08)	(.08)
ASC x Control	---	---
Study Condition		
ASC Prime	-.06	-.10
	(.12)	(.12)
SSC Prime	-.07	.02
	(.12)	(.12)
PVQ	-.07	-.26
	(.19)	(.19)
Control	---	---

Intercept	1.88***	1.45***
	(.13)	(.13)
Adjusted R^2	.17	.18
F value	22.72***	25.07***

Note. $n = 608$. *$p < .05$; *** $p < .001$.

Evidence of a priming effect would be if the strength of association between the ASC and the outcomes were greater in the study conditions as compared to the *Control* condition. Contrary to predictions the strength of association between the ASC and smoking cessation intentions was not significantly different in the *ASC Frame* condition than in the *Control* condition. However, as predicted, the beta weight of the ASC on smoking cessation self-efficacy was significantly higher in the *ASC Frame* condition compared to the beta weight of the ASC in the *Control* condition. Thus, there was some evidence of a priming effect of the *ASC Frame* condition on the relationship between the ASC and smoking cessation self-efficacy.

The *SSC Frame* and *PVQ* conditions did not impact the relationship between the ASC and smoking cessation intentions as compared to the *Control* condition. There was also no evidence that the strength of association between the ASC and smoking cessation self-efficacy was significantly different in the *SSC Frame* condition as compared to the *Control* condition. However, the strength of association between the ASC and smoking cessation self-efficacy

was surprisingly significantly higher in the *PVQ* condition as compared to the *Control* condition.

This outcome suggested that the *PVQ* condition had a priming effect on the ASC. That is, just reviewing one's value priorities increased the strength of the relationship between identification with the ASC and smoking cessation self-efficacy. However, all participants completed the PVQ, regardless of study condition. Thus, one would expect to observe the priming effects of the PVQ in both the *ASC Frame and SSC Frame condition.* Yet, priming effects are only observed when participants either complete only the PVQ (i.e*. PVQ* condition) or when participants complete the PVQ followed by an ASC frame message (i.e. *ASC Frame* condition). When participants complete the PVQ followed by an SSC frame message (i.e. *SSC Frame* condition), there was no evidence of a priming effect. One plausible explanation for these outcomes is that the PVQ has priming effects on the ASC, but SSC frame messages reduce or negate these effects.

Table 14. Pearson's correlations between determinants of smoking cessation and the SSC within study conditions

	ASC Frame *n = 234*	*SSC Frame* *n = 239*	*PVQ* *n = 248*	*Control* *n = 256*
Intentions	-.23	-.14	-.20	-.16
Self-Efficacy	-.23	-.25	-.20	-.24

Priming the SSC. To evaluate the priming effects of the message frames on the SSC, the strength of association between the SSC and determinants of smoking cessation in the *ASC Frame* and *SSC Frame* conditions were compared to the strength of association between the ASC and determinants of smoking cessation in the *Control* condition.

Pearson's product moment correlation coefficients between the SSC and the determinants of smoking cessation are presented in Table 14, sorted by study condition. The correlations suggested that in the *Control* condition, the SSC had a negative relationship with smoking cessation intentions and self-efficacy. Fisher Z transformations evaluated the significance of the differences between the coefficients for each condition and the *Control* condition. The correlation between the SSC and smoking cessation intentions and self-efficacy was not significantly higher in any of the study conditions.

Table 15 summarizes the results of the GLM models evaluating this effect. The results suggested that the SSC had a significant negative relationship with smoking cessation intentions and self-efficacy in the *Control* condition. However, there was no evidence that any of the study conditions increased the strength of this relationship. Thus, neither the correlational nor the GLM analyses suggested that priming effects of the SSC occurred in any of the study conditions.

Table 15. Estimated coefficients of GLM predicting determinants of smoking cessation from the SSC and study condition (standard errors in parentheses)

	Intentions	Self-Efficacy
Variables	*B (se)*	*B (se)*
SSC	-.14*	-.18**
	(.06)	(.06)
SSC x ASC Frame	-.08	-.02
	(.09)	(.08)
SSC x SSC Frame	.02	-.06
	(.09)	(.08)
SSC x PVQ	-.03	-.00
	(.09)	(.08)
SSC x Control	---	---
Study Condition		
ASC Frame	.26	.19
	(.19)	(.18)
SSC Frame	-.07	.31
	(.19)	(.19)
PVQ	.11	.19
	(.19)	(.18)
Control	---	---

Intercept	2.78***	2.26***
	(.13)	(.13)
Adjusted R^2	.04	.06
F value	4.60***	7.14***

Note. n = 608. *p < .05; ** p < .01; *** p < .001.

Discussion

Persuasion effects

This study validates the findings in Study 1 that the ASC has a strong positive association with the determinants of smoking cessation. On the other hand, in contrast with the findings from Study 1, this study suggests that the SSC has a strong negative association with the determinants of smoking cessation.

Contrary to expectations, the ASC frame messages in this study do not successfully manipulate the mean level of identification with the ASC. Yet, as expected, the SSC frame messages also do not impact identification with the ASC. Thus, the messages evaluated in this study do not persuade respondents to increase their identification with the ASC. Though this result suggests that it may not be possible to change identification with the ASC through a cognitive priming manipulation, one potential explanation for this lack of effect is that in this study is that participants were exposed to messages expressive of all possible values identified by Schwartz (1992). Messages with ASC frames may be more

persuasive if they speak to values that the viewer's hold as important for self-definition, as compared to focusing on all possible values.

However, there is some evidence that messages with an ASC frame reduce the mean level of identification with the SSC. This unexpected result suggests that messages emphasizing the ASC may reduce the degree to which participants' identify with the SSC. Though further evidence of this relationship is needed, it may be that messages with an ASC frame lead viewers to self-reflect on their identity as a smoker. By focusing the audience's attention on a conception of themselves in the future, this message may lead audience members to detach themselves from their current identity as a smoker, decreasing their identification with the SSC.

Because of the repeated measures design, these outcomes must be interpreted with caution. Identification with the SSC and ASC were measured twice in this study, once before and once after exposure to the smoking cessation message. There is no way to account for the influence of the first measurement occasion on the second, or for the influence of the first measurement occasion on reactions to the message itself. For example, responding to SSC items before exposure to the manipulation may have influenced the priming effects of those manipulations, or sensitized participants to the items measuring those constructs. Thus, further studies are needed to

determine the effects of the messages on identification with the SSC and ASC in the absence of a pre-test of these variables.

Future studies are needed to determine whether messages can increase overall identification with the ASC. Another study is needed to evaluate the effects of these messages when they expresses high (versus low) priority values, as opposed to the messages used in this study which were expressive of all possible values. Individuals have a desire to align their attitudes and behaviors with their values and values serve as a motivational structure for behaviors. It may be that combining the ASC frame with a message focused on prioritized values would enhance the persuasive effects of the messages. By illustrating the relationship between high priority values and the ASC, rather than focusing on all possible values, messages may effectively increase smoking cessation intentions and self-efficacy through these self-concepts.

Priming effects

This study provides initial evidence that ASC frame messages prime the ASC. Particularly, the outcomes of this study highlight the relationship between identification with the ASC and self-efficacy towards smoking cessation behaviors that allow one to become this self-concept in the future. These results are consistent with theory that future self-concepts such as the ASC play a motivational role in behaviors and influence the actions people intent to take. On

the other hand, the SSC frame messages do not significantly impact the salience of the ASC in its relationship with the determinants of smoking cessation, and thus as expected, there is no evidence that the SSC frame messages prime the ASC.

Interestingly, completing the PVQ was also primed the ASC and smoking cessation self-efficacy. The result supports the predictions of affirmation theory that reviewing ones values makes individuals more receptive to smoking cessation messages. Thus, it may be that the priming effects observed in the *ASC Frame* condition occurred because of exposure to the PVQ task. However, these priming effects are not observed in the *SSC Frame* condition, even though participants in that condition also completed the PVQ task. This outcome suggests that PVQ-related priming effects may be reduced or negated after exposure to SSC framed messages, and warrants further exploration in subsequent studies.

Neither ASC nor SSC frame messages prime the SSC. This outcome is positive given that the SSC has a negative relationship with the determinants of smoking cessation in this study. If the messages primed this self-concept, this priming would negatively impact the determinants of smoking cessation, and thus reduce the likelihood of smoking cessation behaviors.

None of the messages evaluated in this study primed the SSC. This result suggests that the SSC may be chronically accessible and thus have a persistent effect on the determinants of smoking cessation that is not impacted by primes. However, the lack of evidence of priming of the SSC may reflect the way the priming effect was captured in this study. It is possible that because of the nature of the SSC, priming effects cannot be evaluated by examining the strength of association between this self-concept and determinants of smoking cessation. Thus, the messages may have primed the SSC, but that increased salience was not captured by the variables measured in this study. It may also be possible that, as described above, completing the PVQ prior to exposure to the messages impacted the priming effects of the SSC such that they were reduced or negated. If this is the case, such priming effects should become apparent in the absence of the PVQ. The main study (Study 6, Chapter 7) evaluates this possibility.

Taken together, the findings of this study lend some initial support of the prediction that ASC frame messages may be an effective route through which to impact smoking cessation behaviors. Even though the effects observed in this study are weak, they suggest that if participant identification with the ASC can be increased and if the ASC can be primed, smoking cessation intentions and self-efficacy could increase. This study also highlights the importance of ensuring that smoking cessation messages do not unintentionally prime the SSC, thereby reducing the determinants of smoking cessation.

CHAPTER 4: STUDY 3 (Pilot 1, Part 2)

The aims of Study 3 are to (a) identify smokers' high and low priority values and (b) to determine whether these priorities differ based on the magnitude of identification with the smoking-related self-concepts. This study describes smokers' value priority rankings and determines whether value priority rankings differ by level of identification with the ASC and SSC. This study is a web-based survey.

The research questions evaluated in this study are:

Research Question 1: What is the distribution of the value priority rankings among smokers?

Research Question 2: Does identification with the ASC or SSC impact value priority rankings?

Method

Participants and Research Design

Data for this study was collected as part of the study described in Chapter 3. The participants are the same for both parts of this study and the research design is discussed in detail in Chapter 3. All participants in the study completed a gender specific version of Schwartz's Portrait Value Questionnaire (PVQ, Schwartz et al., 2001). Participants in the *SSC Frame*, *ASC Frame,* and *PVQ*

conditions completed the PVQ prior to moving on to the other parts of the study (i.e. message categorization task, items assessing determinants of smoking cessation, and identification with the ASC and SSC). Participants in the *Control* condition answered smoking cessation intentions and self-efficacy items first, and then completed the PVQ. Because answering items assessing determinants of smoking cessation may have affected the value ratings, this analysis excluded participants in the *Control* condition, and the outcomes were pooled across the remaining three conditions where PVQ items were assessed prior to any other activity.

Measures

This study evaluates participant responses to PVQ items. Participant demographics, smoking-related characteristics, ASC and SSC, and determinants of smoking cessation were measured as described in Chapter 3.

PVQ. The PVQ contains 40-items representing ten motivational types of values which each correspond to several specific values. The PVQ items are concrete examples of people matched in gender to the respondent. Participants are instructed: "Now you will see descriptions of different people. Please read each description and tell us how much each person is or is not like you.*"* A sample item representing the value of *security* is, "It is important to him/her to live in secure surroundings. He/she avoids anything that might endanger his/her

safety." Participants reported the degree to which the person described by the items was "like them" on a 6-point scale (1= not at all like me, 2 = not like me, 3 = a little like me, 4 = somewhat like me, 5 = like me , and 6 = very much like me). PVQ items and their corresponding values can be found in Appendix C.

Analysis

All analyses were conducted using SAS Version 9.3. To generate the value priority rankings, scores for each value were computed as a mean of PVQ items corresponding to that value. To correct for individual differences in using the scale, an overall mean for all PVQ items was calculated for each individual and subtracted from the mean score for each value. Because value priorities were assessed within-subjects as well as between subjects, repeated measures ANOVA was conducted. Correlations among measurements within each individual were modeled through the specification of a covariance structure. Because each value was compared to every other value and there were no specific predictions as to the value priorities, Tukey-Kramer post hoc tests compared predicted least squares means for each value priority ranking.

To assess the impact of identification with the ASC and SSC on value priority rankings, interaction terms between value priority rankings and identification with the ASC and SSC were entered into the model. Respondent demographic characteristics were included in the model as control variables.

Table 16. Internal consistency of values and Pearson's correlations between value priority rankings (n = 606)

	α	Uni	Self	Stim	Hed	Ach	Pow	Sec	Con	Tra
Benevolence	.74	.31	.00	-.15	-.21	-.38	-.47	-.16	.01	.11
Universalism	.79		.19	-.23	-.23	-.47	-.49	-.15	-.14	-.04
Self-Direction	.61			.12	.03	-.13	-.06	-.25	-.39	-.30
Stimulation	.78				.54	.22	.19	-.52	-.51	-.41
Hedonism	.80					.14	.18	-.37	-.43	-.40
Achievement	.85						.48	-.19	-.23	-.42
Power	.69							-.10	-.29	-.31
Security	.64								.36	.22
Conformity	.75									.44
Tradition	.53									--

Results

Descriptive Results

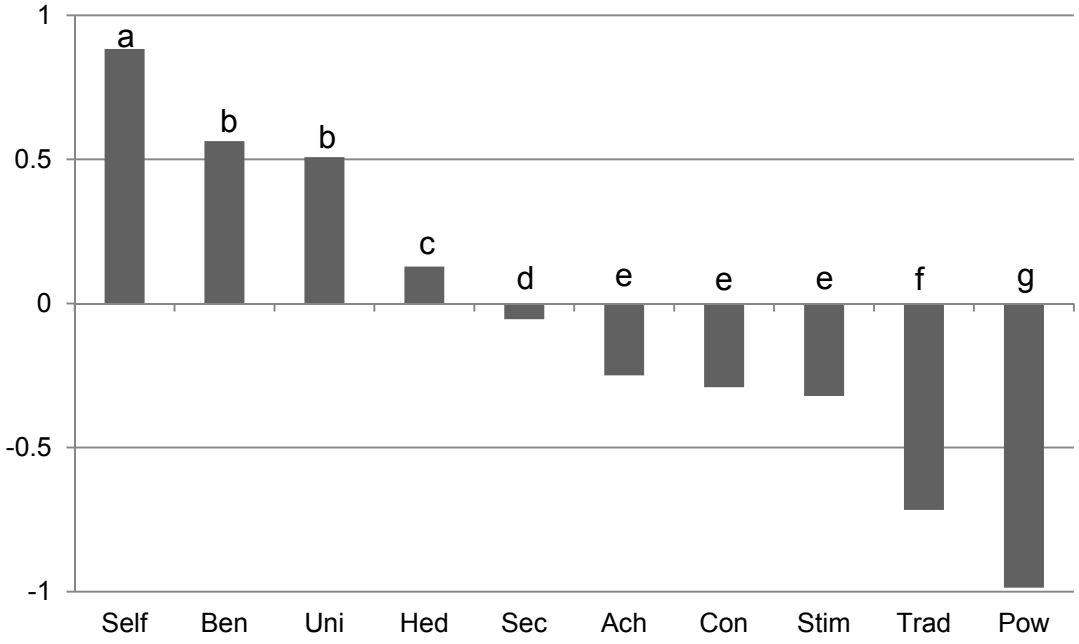
Participant characteristics are discussed in detail in Chapter 3.

Value priority rankings

Internal consistency of the values and Pearson's product moment correlation coefficients between value priority rankings are summarized in Table

16. The reliabilities of the scales for each value were acceptable and the pattern of correlations among the values supports the structure of values described by Schwartz (1994).

Figure 4. Predicted least square means of value priority rankings



Note. Significantly different means are marked with a different subscript.

Using a GLM with only values as a predictor, mean priority rankings were generated for each value. Post-hoc analysis using the Tukey-Kramer correction methods compared the priority rankings of each value to every other value. Results showed that self-direction was the most prioritized value; benevolence and universalism were ranked second in priority; hedonism was ranked third;

security was ranked fourth; achievement, conformity, and stimulation were ranked fifth; tradition was sixth, and power was the least prioritized value. These results are presented graphically in Figure 4.

Table 17 presents the results of the GLM model assessing the impact of identification with the ASC and SSC on value priority rankings, controlling for participants demographics. The interaction effect between the ASC and the value priority rankings is not significant F (9, 5427) = 1.58, p = .115, suggesting that mean value priorities did not differ based on the magnitude of identification with the ASC.

There was a significant interaction effect between the SSC and the values, F (9, 5427) = 2.46, p = .009, suggesting that mean value priorities differed based on identification with the SSC. To explore the effects of this interaction further, post-hoc tests generated predicted least square means of the value priority rankings based on five levels of identification with the SSC (i.e. from low to high identification).

The results showed that as identification with the SSC increased, the priority placed on hedonism values increased and the priority placed on conformity values decreased. However, the rank order of value priorities remained the same regardless of the participants' level of identification with the SSC. Figure 5 displays these results graphically.

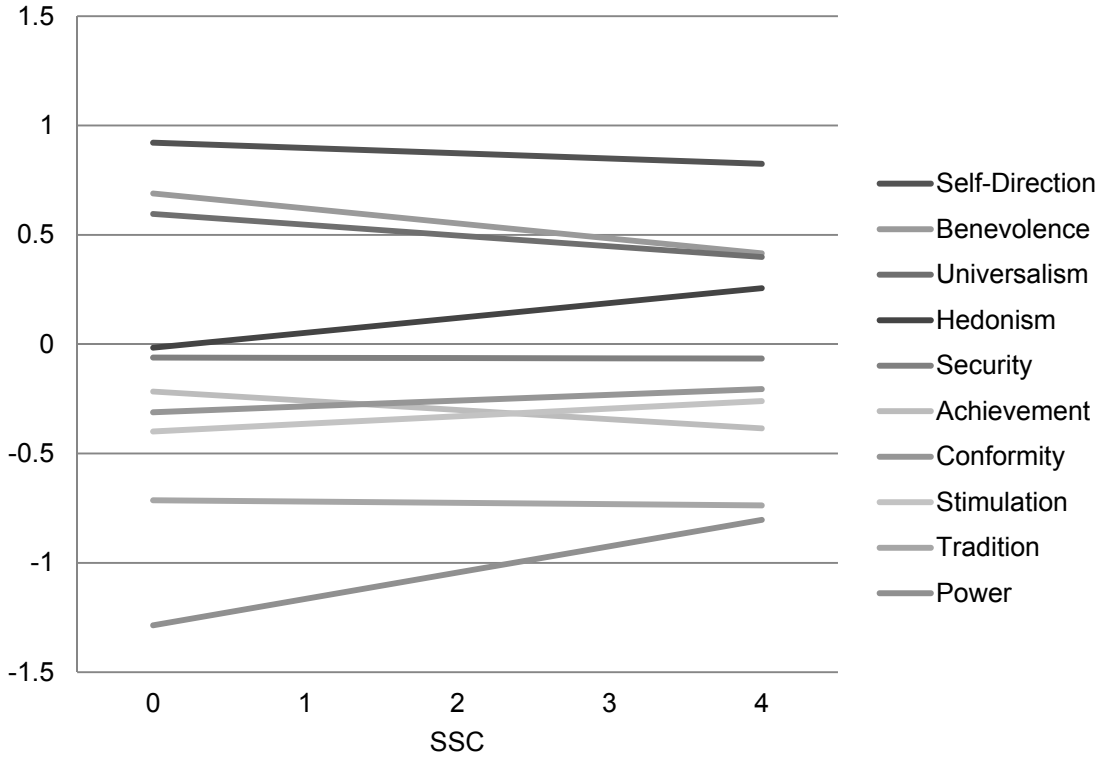
Table 17. Estimated fixed and random effects coefficients of repeated ANOVA predicting value priority rankings by the ASC and the SSC

	Fixed and Random Effects		
	df		
Effect	Numerator	Denominator	*F*
Values	9	5427	24.81***
ASC	1	597	.04
Values* ASC	9	5427	1.58
SSC	1	597	6.08*
Values* SSC	9	5427	2.46**
Income	1	597	2.86
Education	1	597	1.75
Age	1	597	79.54***
Hispanic	1	597	1.94
Black	1	597	0.29
Male	1	597	15.65***
Variance components			
Between-individuals	.80***		
	(.01)		
Within-individuals	.07***		
	(.00)		
Fit Statistics			

-2 Log Likelihood (*df*)	14478.0
	(42)
AIC (smaller is better)	14482.0

Note. *N* = 6,060 (606 respondents * 10 values). Entries are fixed effects estimates where random effects estimate a compound symmetric covariance structure. * $p < .05$, ** $p < .01$, *** $p < .001$

Figure 5. Predicted least square means of value priority rankings by identification with the SSC



Discussion

This study provides insights into how smokers prioritize values: self-direction is ranked as the most important value; benevolence and universalism are ranked second in priority; hedonism is ranked third; security is ranked fourth; achievement, conformity, stimulation are ranked fifth; tradition is sixth; and power is ranked as the least prioritized value. Identification with the ASC is not associated with differences in mean rankings of the values. Identification with the SSC is associated with differences in mean rankings of certain values; however the SSC does not impact the rank order of the values. Thus, identification with the smoking-related self-concepts is not associated with differences in the rank order of the values.

The rank order of values among smokers in this study is similar to the rankings of values Schwartz and Bardi (2001) found in their study of over 100 nations (Table 18 compares these means). However, smokers differ from the more general population in that smokers prioritize the self-oriented value of self-direction as most important, while the general population prioritizes the pro-social value of benevolence as most important. This outcome underscores the subtle differences between individuals who smoke and the general population. Intriguingly, unlike the general population, smokers place greater importance on values that serve their own interests rather than those that serve the interests of others.

Table 18. Mean-centered value rankings

	Pilot Study	Schwartz et al. (2001)
Self-direction	.88	.23
Benevolence	.56	.63
Universalism	.51	-.04
Hedonism	.13	.02
Security	-.05	.16
Achievement	-.25	-.06
Conformity	-.29	-.79
Stimulation	-.32	-.53
Tradition	-.72	-1.40
Power	-.99	-1.00

The results show that similar to the general population, smokers place the least priority on power values. Power values (e.g., authority, wealth) focus on social esteem and are related to seeking social approval. These values emphasize the attainment or preservation of a dominant position within the more general social system and the pursuit of one's own relative success and dominance over others.

Interestingly, self-direction and power are circumplex opposites, and thus have opposite motivations for behavior. Self-direction values represent control over one's own actions and behaviors and freedom to make one's own decisions,

while power values represent control over others, and the opportunity to make decisions for others. Thus, while smokers prioritize values that serve their own interests over those that serve the interests of others, they do not place as much importance on values that enhance their social dominance as they do on other values.

The results of this study show that there is consensus among smokers as to the relative importance of values. There is a common value structure held by all individuals who smoke cigarettes: the most important value is self-direction and the least important value is power. The priorities placed on these values do not differ based on the degree to which smokers identify with the ASC or SSC and therefor do not distinguish between individuals who increasingly view themselves as smokers or are able to imagine themselves as non-smokers.

The results of this study suggest that messages in the final study can focus on these shared value priorities, rather than needing to tailor messages to individual value priorities. Message content that speaks to self-direction, the top rated value, can be compared to message content that speaks to power, the bottom rated value. Because smokers prioritize the value of self-direction over the value of power, messages that present the relationship between the smoking-related self-concepts and self-direction should be more persuasive and be viewed as more relevant to participants as compared to messages that focus on power.

CHAPTER 5 STUDY 4 (Pilot 1, Part 3)

The aims of Study 4 are to develop value-expressive messages. Messages generated for the purpose of this study are evaluated to ensure that their message content reflects their respective value. The hypothesis evaluated in this study is:

Hypothesis 5: Value-expressive messages will be perceived as belonging more to their value category than to their circumplex-opposite value category.

Method

Participants and Research Design

Data for this study was collected as part of the study described in Chapter 3. The participants are the same for both parts of this study and the research design is discussed in detail in Chapter 3.

Messages

The messages were designed to be expressive of specific values. Messages were presented as either emphasizing the benefits of becoming a non-smoker for achieving the focal value (*ASC Frame* condition) or as the drawbacks of being a smoker for achieving the focal value (*SSC Frame* condition).

The ASC frame messages illustrated how becoming a non-smoker would enable one to achieve the motivational goals of the focal value. For example, the

hedonism expressive message with an ASC frame stated, “As a non-smoker when I eat a delicious meal I will be able to actually taste it.” The SSC frame messages illustrated how being a smoker prevents one from achieving the motivational goals of the focal value. For example, the hedonism expressive message with a SSC frame stated, “As a smoker when I eat a delicious meal I am not able to actually taste it.”

Measures

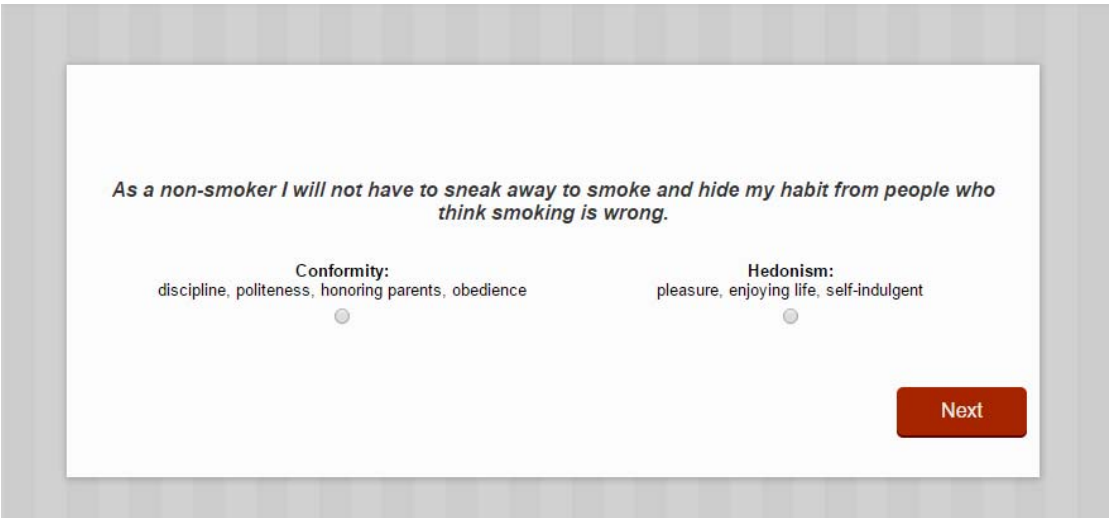
Message categorization task.

Message categorization was evaluated through a forced-choice task. Participants viewed a randomly selected value-expressive message and the names and representative single values of two motivational types of values: the value expressed in the message and its circumplex-opposite value (see Figure 6 for example). For each of the nine motivationally distinct values, one of two possible circumplex opposite values was randomly presented to participants. The exception was the values of hedonism and stimulation, which had three circumplex opposite values and thus one of these three values was randomly presented. Participants were instructed to categorize the message with the value that they believe it best matched.

This design accounted for the interdependence between values. Because of the inter-correlations between values along a motivation continuum, a value-expressive message contains overlapping content with its circumplex-neighboring value. However, this message should not contain content of a motivationally opposite value. With a forced choice between two values, a

successful message should be correctly matched with its intended value slightly higher than midway between chance (50%) and a perfect score (100%) – or at least 80% of the time.

Figure 6. Message categorization task sample item



Analysis

The analysis evaluated whether value-expressive messages were perceived as belonging more to their value category than to their circumplex-opposite value category. All analysis was conducted using SAS Version 9.3.

Each participant viewed nine value-expressive messages with either a SSC frame or an ASC frame. Thus, message categorization outcomes were assessed within-subjects as well as between subjects (i.e. each respondent evaluated nine messages, and each message was evaluated by an average of 91 respondents). Repeated-measures ANOVA was conducted and correlations

among measurements within each individual were modeled through the specification of a covariance structure.

The model included a variable representing the value expressed in the message, the version of the message corresponding to that value (two messages were evaluated for each value), and the frame of the message (ASC frame or SSC frame). Interactions between these variables were also included, such that the final three way interaction of these variables (value * version * frame) represented the mean classification score for each unique message. Predicted least squares means representing mean percentage correct classification for all possible comparison values were generated from the model for each message version by frame combination.

Next, to ensure that there was no bias in message categorization outcomes related to participant demographics (e.g. correct classification was more difficult for less educated respondents) respondent demographic characteristics were added to the model. To control for the effects of presentation order on the message categorization task, dummy variables for the study conditions were added to the model.

Table 19. Estimated fixed and random effects coefficients of repeated ANOVA predicting message categorization outcomes from message and participant characteristics

	Model A: Random Effects			Model B: Fixed and Random Effects		
	df			*df*		
Effect	Numerator	Denominator	*F*	Numerator	Denominator	*F*
Value	8	6411	10.92***	8	6403	11.02***
Version (1 or 2)	1	799	3.55	1	798	3.44
Frame (ASC or SSC)	1	804	146.01***	1	796	143.59***
Value * Version	8	6411	17.04***	8	6403	17.08***
Value * Frame	8	6411	13.07***	8	6403	12.96***
Version * Frame	1	799	4.60*	1	798	4.49*
Value * Version * Frame	8	6411	1.55	8	6403	1.63
Income				1	796	1.30
Education				1	796	2.50

Age			1	796	.57
Hispanic			1	796	2.08
Black			1	796	.05
Male			1	796	2.19
Study Condition			1	796	.33
Between-individuals	.17***		.17***		
	(.00)		(.00)		
Within-individuals	.02***		.02***		
	(.00)		(.00)		
Fit Statistics					
-2 Log Likelihood (*df*)	8557.4		8605.3		
	(88)		(95)		
AIC (smaller was better)	8561.4		8609.3		

Note. *N* = 7,251 (806 respondents * 9 values). Entries were fixed effects estimates where random effects estimate a compound symmetric covariance structure. * $p < .05$, *** $p < .001$

Results

Across the four study conditions, participants correctly classified messages according to their corresponding value on average 71.1% of the time (*SD* = 21.0%). Results of the repeated-measures ANOVA of message categorization outcomes are summarized in Table 19. The compound symmetric covariance structure modeled the correlations among measurements of the values. Table 19, model A summarizes the results when only message characteristics were included. There was a significant effect for message frame. *SSC Frame* messages were more difficult to categorize correctly than *ASC Frame* messages.

Table 19, model B presents the results with demographic characteristics included in the model. None of the demographic characteristics made significant contributions to the model, suggesting that the likelihood a message being correctly classified was not biased by demographic characteristics of respondents. Messages were equally likely to be correctly classified regardless of respondent demographic characteristics.

Table 20 displays the correct classification percentages generated from this model. Correct classification scores for each value-expressive message in the *SSC Frame* condition ranged from 47.0% to 85.0%, with only one message meeting or exceeding the minimum 80% correct classification standard.

Table 20. Percent correct message categorization by message version and frame

	Version 1		Version 2	
Value	ASC Frame	SSC Frame	ASC Frame	SSC Frame
Benevolence	67.8	51.1	77.8	66.0
Universalism	90.8	74.0	81.2	59.9
Self-Direction	82.3	71.4	83.0	64.0
Stimulation	61.7	57.7	79.7	71.0
Hedonism	92.0	85.0	70.3	65.1
Achievement	88.9	47.0	91.9	50.7
Power	71.9	63.6	66.8	56.1
Security	72.9	58.1	82.8	62.8
Conformity	83.5	75.8	80.5	51.6

A lower proportion of respondents who viewed the *SSC Frame* messages correctly classified those messages (ρ_i = .63, *SD* = .22) as compared to those who viewed the *ASC Frame* messages (ρ_i = .79, *SD* = .17). The lower range of item difficulty in the *SSC Frame* condition was .11, meaning that some respondents only correctly classified one out of nine of the messages. Given the expected homogeneity of responses, the low proportion of respondents who correctly classified the *SSC Frame* messages indicated that the task was too hard, and that the results from this portion of the study were not useful.

Discussion

The message categorization task was too difficult and thus was not successful. Several explanations exist for the difficulty of the task. There may be an overlap between the values represented in the message and their opposite values such that the messages developed for this study express multiple values. In addition, the value definitions used in the message matching task may be vague or unclear, such that messages that uniquely represented one value may appear to represent a different value based on that value's definition. Finally, messages worded in the negative are significantly more difficult to categorize correctly as compared to messages worded in the positive. Because the task was set up in a way that the messages expressed a lack of the value, their correct categorization is more difficult and requires linguistic skill to infer the opposite. This outcome underscores the difficulty participants experience across studies in responding to items worded in the negative (Barnette, 2000).

The results of the message categorization task are not as expected and further testing was conducted in the next study to create value-expressive messages. Results from this study suggest that the another study of the value content of messages would benefit from the following improvements: (1) instructions to participants that increase clarity of the task, (2) measures of value content that avoid negative wording, and (3) value content that is inclusive of the multiple sub-values that make up each value.

Chapter 6: STUDY 5 (Pilot 2)

Because the message categorization task in Study 4 was not successful, modifications were made in this study to the categorization procedure, the messages, and the instructions. The categorization procedure was changed to a series of items measuring the value content of the message, a task similar to the method described by Hullett and Boster (2001). The messages were updated to contain value content that was inclusive of the multiple sub-values that make up each value. The instructions to participants were altered to increase clarity of the task and the measures of value content were revised to avoid negative wording.

Study 3 demonstrated that there is consensus among smokers as to the relative importance of values, regardless of their identification with the smoking related self-concepts. The most important value for smokers is self-direction and the least important value is power. Thus, this study focuses on these two values exclusively, and aims to assess respondent's perceptions of the self-direction and power content of messages expressive of those values. The outcomes of this study can then be used for the main study, with the goal of comparing message content that speaks to self-direction, the top rated value, to message content that speaks to power, the bottom rated value.

The secondary aim of this study is to assess respondent's evaluations of the messages' perceived effectiveness and personal relevance; and to evaluate

defensive reactions to the messages. This study is a randomized web-based experiment with a two value (self-direction vs power) x two frame (ASC vs SSC) design.

The hypotheses evaluated in this study are:

Hypothesis 6: The self-direction expressive messages will be perceived to have higher self-direction content than the power expressive messages.

Hypothesis 7: The power expressive messages will be perceived to have higher power content than the self-direction expressive messages.

Hypothesis 8: The self-direction expressive messages will be perceived to be more personally relevant than the power expressive messages.

Hypothesis 9: The ASC frame messages will produce less reactance than the SSC frame messages.

In addition, it was expected that the messages would not be different in terms of perceived effectiveness so that while the content of the messages would vary, the quality of the messages would not vary.

Method

Participants

Data for this study was collected during March 2015. The study used a sample of English-speaking American smokers ages 18 and over recruited through the Amazon Mechanical Turk (MTurk) web service. Participants were recruited through a Human Intelligence Task (HIT) posted to MTurk. Participants who qualified and completed the study were offered a modest compensation.

Respondents were eligible for the study if they were adults (ages 18+) who were current cigarette smokers: they reported having smoked at least 100 cigarettes in their lifetime and currently smoked every day (Centers for Disease Control and Prevention, 2011). Of 966 individuals who accepted the HIT and began the survey, 56.9% (*n* = 550) smoked at least 100 cigarettes in their life. Of those, 37.6% (*n* = 207) were regular daily smokers and thus qualified for the study. Of the qualified participants, 97.1% (n = 201) completed the survey.

Research Design

This study was an online experiment hosted by Qualtrics, LLC. Participants could complete the surveys on any computer with an internet connection. On average, the survey took 8.4 minutes to complete (*SD* = 5.1 minutes).

Figure 7. Schematic of Study 5

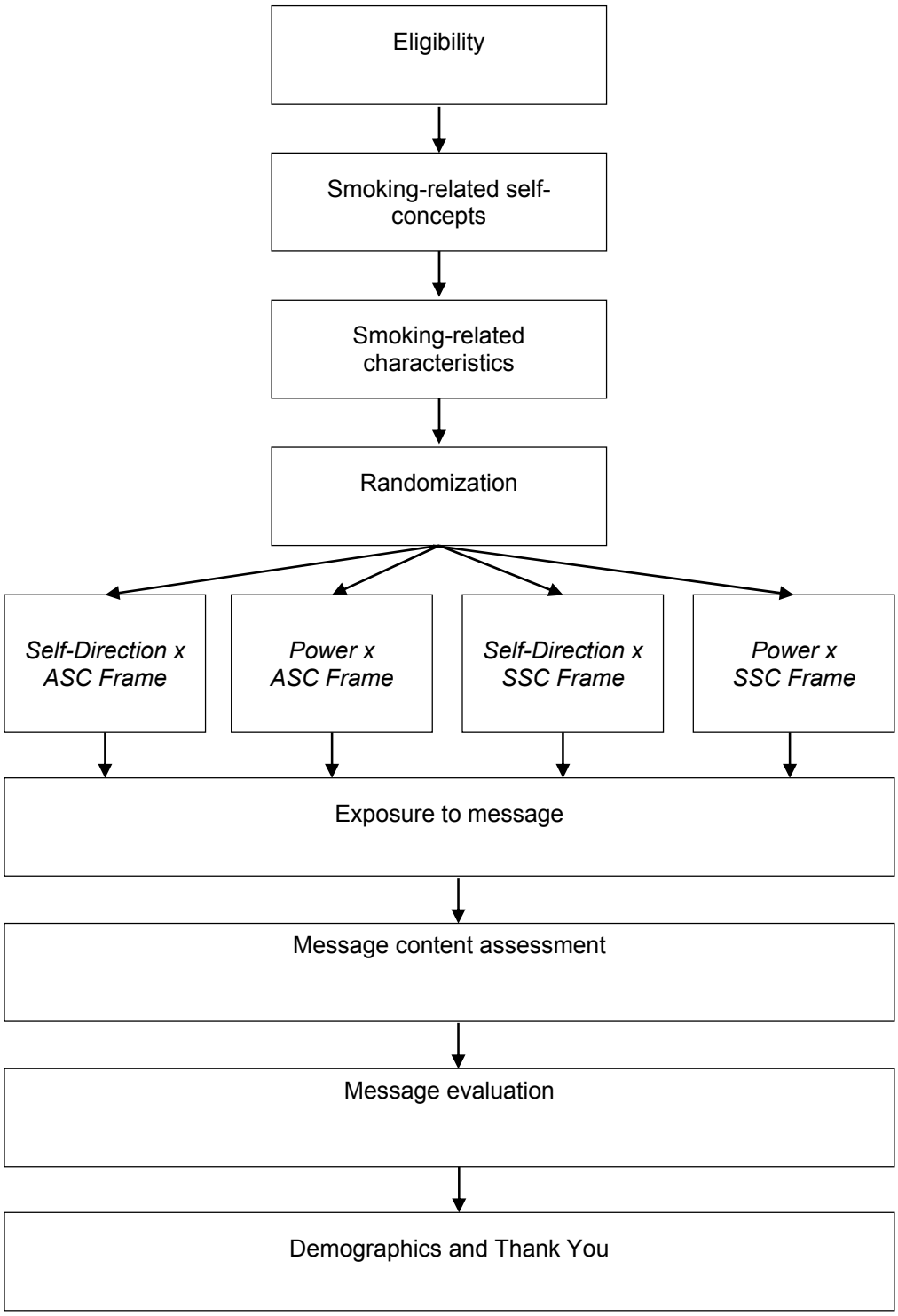


Figure 7 shows a schematic of the flow of the study. After providing consent and determining eligibility for the study, participants answered items assessing the degree to which they identify with the ASC and SSC and their smoking-related characteristics. Participants were then randomly assigned to one of four conditions: (1) self-direction values x ASC frame (*Self-ASC*), (2) self-direction values x SSC frame (*Self-SSC*), (3) power values x ASC frame (*Power-ASC*), or (4) power values x SSC frame (*Power-SSC*). Participants were then informed that they would be viewing a message that may be used sometime in the future, and were presented with the message as text on the screen. After viewing the message, participants answered items measuring the value content of the message, perceived effectiveness and relevance of the message, and reactance to the message. After these sections, participants answered demographic items and were thanked for their participation in the study.

Messages

One message was designed for each of the four study conditions. The messages were roughly equal in length and number arguments presented. The messages were presented as public service announcements that may be used on television sometime in the future. The messages were textual with no images or sound, and presented on-screen. See Table 21 for the complete text of the messages.

Table 21. Messages by values and frames

Value	ASC Frame	SSC Frame
Self-Direction	Becoming a non-smoker will give me back my self-respect and control over my own life. I will have more freedom. Smoking will no longer be in control of my life, I will be in control of ME. I will no longer be an addict controlled by the substance I'm addicted to. I will not be trapped in the prison of nicotine addiction. I will be independent. I won't need my cigarettes anymore. Addiction will no longer steal my right to choose my own actions.	Being a smoker takes away my self-respect and control over my own life. I don't have freedom. Smoking is in control of my life, I am not in control of ME. I am an addict controlled by the substance I'm addicted to. I am trapped in the prison of nicotine addiction. I am not independent. I need my cigarettes. Addiction steals my right to choose my own actions.
Power	Becoming a non-smoker will make others view me as a more powerful person. People in general will have more respect	Being a smoker makes others view me as a less powerful person. People in general have less respect for me. I worry that

for me. I will no longer worry that non-smokers look down on me because of my smoking. I can be a leader for others. I won't seem like a hypocrite when I try to influence others to be healthier. Smoking will no longer undermine my authority. I will not fear that others see me as failing or being incapable of quitting.	non-smokers look down on me because of my smoking. I cannot be a leader for others. As a smoker I seem like a hypocrite when I try to influence others to be healthier. Smoking undermines my authority. I fear that others see me as failing or being incapable of quitting.

The content of the messages varied based on whether they were expressive of self-direction or power values, and whether they were framed in terms of the ASC and SSC. Content from the Schwartz values inventory was used in the messages to ensure a match between the messages content and each of the values.

The self-direction expressive messages associated smoking and smoking cessation with freedom, choosing one's own goals, and independence. The ASC frame self-direction expressive messages contained information related to freedom from addiction, and the SSC frame self-direction expressive messages

contain information related to the negative effects of nicotine addiction on self-direction goals.

The power expressive messages associated smoking and smoking cessation with authority, social status, and preserving one's public image. The ASC frame power expressive message contained information about how quitting smoking would enhance ones social standing and leadership potential, and the SSC frame power expressive message contained information about how being a smoker inhibits ones leadership potential and social standing.

Measures

Demographics. Respondent characteristics collected consisted of demographic characteristics including age, gender, race/ethnicity (recoded as African American, White, or Other), Hispanic origin (recoded as Hispanic or not), years of educational attainment, and income.

Smoking-related characteristics. Four smoking-related characteristics were collected: nicotine dependence, stage of change, number of quit attempts, and age at smoking initiation.

To measure the intensity of participants' physical dependence on nicotine, the Fagerström Test for Nicotine Dependence was used (FTND, Heatherton et al., 1991). The FTND has six items assessing: (a) number of cigarettes smoked per day, (b) how soon one smokes a cigarette after waking, (c) whether one

smokes when they are ill, (d) ability to refrain from smoking in places where smoking is forbidden, (e) whether one considers the first cigarette of the day as the most difficult to give up, and (f) whether one smokes more frequently during the first hour after waking. A higher score on the scale indicates stronger physical dependence on nicotine.

Participant's level of readiness to quit smoking was measured according to the transtheoretical model (TTM; Prochaska & DiClemente, 1983) using a modified version of the Ladder of Contemplation (CL, Biener & Abrams, 1991). Participants were asked to choose a number between 0 and 10 indicating where they were in thinking about quitting smoking. Five numbers on the ladder were marked as points: 0 read 'I have no thoughts about quitting smoking'; 2 read 'I think I need to consider quitting smoking someday'; 5 read 'I think I should quit smoking but I'm not quite ready'; 8 read 'I am starting to think about how to reduce the number of cigarettes I smoke a day'; and 10 read 'I am taking action to quit smoking'. A higher score on the CL indicated greater interest in smoking cessation.

To measure past smoking cessation attempts, participants were asked how many times they had stopped smoking for one day or longer because they were trying to quit smoking in the past twelve months. As well, participants were asked how old they were when they smoked their first whole cigarette.

Smoking-related self-concepts. ASC and SSC were measured using a modified version of previously validated scales (Falomir & Invernizzi, 1999; Shadel & Mermelstein, 1996). To determine the magnitude of identification with the smoker self, participants were asked to indicate their level of agreement on a 5-point scale (0 = strongly disagree, 4 = strongly agree) with three items: 'Smoking is a part of my self-image;' 'Smoking is part of my personality;' and 'I think of myself as someone who is a smoker.' These three items were averaged into an overall score indicating identification with the SSC (α = .0.86).

To determine the magnitude of identification with the an abstainer self, participants were asked to indicate their level of agreement on a 5-point scale (0 = strongly disagree, 4 = strongly agree) to three items: 'I am able to see myself as a non-smoker'; 'It is easy to imagine myself as a non-smoker'; and 'I am comfortable with the idea of being a non-smoker.' These items were averaged into a measure indicating overall identification with the ASC (α = .0.88).

Value content. Message value content was measuring using eight items: four items to assess the respondent's perception of the self-direction content and four items to assess the respondent's perception of the power content. All responses were measured on a 5-point scale (0 = strongly disagree, 4 = strongly agree). The measure was adopted from Hullet and Boster (2001) and varied by on whether participants were in the SSC frame or ASC frame conditions. In the SSC frame conditions, the measure assessed the degree to which respondents

perceived the message as advocating smoking as hindering the attainment of a particular value. In the ASC frame conditions, the measure assessed the degree to which respondents perceived the message as advocating smoking cessation as enhancing the attainment of a particular value. The four power items were averaged into an overall score of the power content of the messages (α = .0.85), and the four self-direction items were averaged into an overall score of the self-direction content of the messages (α = .0.88).

Perceived effectiveness. Five items assess respondent's perceived effectiveness (PE) of the messages on a 5-point scale (0 = strongly disagree, 4 = strongly agree). Participants were asked to indicate their agreement that the information in the message: is convincing, is believable, helped me feel confident about quitting smoking, put thoughts in my mind about quitting smoking, and put thoughts in my mind about wanting to continue smoking. A PE score was calculated by taking the difference between the responses to the last two items, multiplying that difference by .5, and adding two to the value to put in on the same scale as the other three items. The resulting item was averaged with the remaining three items to generate an overall PE score for each message (α = .0.81).

Relevance. Three items measured the personal relevance of the message on a 5-point scale (0 = strongly disagree, 4 = strongly agree). Participants were asked to indicate their agreement with items stating that the information in the

message: applied to me, is relevant to my everyday life, and is important to me. An overall relevance score was generated from the average of these three items, with a higher score indicating greater relevance (α = .0.90).

Reactance. Four items measured psychological reactance to the messages on a 5-point scale (0 = strongly disagree, 4 = strongly agree). Participants were asked to indicate their agreement that the information in the message: is dishonest, tries to manipulate me, is exaggerated, and makes me feel angry at the warning label and its sponsors. An overall reactance score was generated from the average of the items, with a higher score indicating greater reactance (α = .0.82).

Analysis

A GLM fit using the method of least squares evaluated the effects of the message conditions on evaluations of message value content, PE, relevance, and reactance. Each model applied a Gaussian response distribution. Where data were missing, list-wise deletion was used due to few missing values. All analysis was conducted using SAS Version 9.3.

To evaluate the value content of the messages, planned contrasts compared self-direction messages and the power messages in terms of their self-direction and power content.

To evaluate the effects of the study conditions on evaluations of PE, planned contrasts compared mean PE ratings of each message to every other message. To control for the probably of Type I error, Tukey-Kramer post hoc tests compared predicted least squares means for the PE ratings.

To evaluate the prediction that the self-direction messages would be perceived as more relevant than the power value messages, planned contrasts compared mean relevance ratings between the self-direction expressive messages and the power expressive messages. To evaluate the prediction that the ASC frame messages would produce less reactance comparted to the SSC frame messages, planned contrasts compared mean reactance to the ASC and SSC frame messages.

Results

Descriptive Results

Among qualified participants who completed the survey, seven respondents did not have a match between their reported year of birth and their age and as a quality control measure are excluded from the analysis. Thus, a total of 194 participants were included in the sample for this study.

For the distribution of demographics and variables included in the models among participants who completed the study see Table 22. The sample consisted of regular smokers between 21 and 75 years of age (*M* = 34.99, *SD* =

11.83). Participants were predominately male (51.5%) with representation among Hispanic (5.2%) and African-American (11.3%) participants. Participants completed an average of 14.64 years of education (*SD* = 1.70), and earned an average of 49.29 thousand dollars per year (*SD* = 34.53 thousand dollars).

Participants generally neither agreed nor disagreed that they identified with the SSC (*M* = 2.16, *SD* = 1.01) and the ASC (*M* = 2.13, *SD* = 1.13). Participants were on average at the midpoint of the FTND (*M* = 4.31, *SD* = 2.45) and CL (*M* = 4.98, *SD* = 2.86) and attempted to quit smoking in the past year between 0 and 20 times (*M*= 1.41, *SD* = 2.55). Participants initiated smoking at a median age of 16 years (*M* = 16.30, *SD* = 3.60). Participants on average disagreed that the messages produced reactance (*M* = 2.59, *SD* = .96), agreed with items evaluating the message PE (*M* = 3.26, *SD* = .85), and agreed that the messages were relevant (*M* = 3.29, *SD* = 1.10).

Table 22. Pilot 2 (Study 5) participant characteristics

Variable	*M* (%)	*SD*	Min.	Max.
Age	34.99	11.83	21	75
Female (%)	48.5			
Black/ African-American (%)	11.3			
Hispanic/ Latino (%)	5.2			
Education (years)	14.64	1.70	0	18
Income (thousands of dollars)	49.29	34.53	12.5	175
FTND	4.31	2.45	0	10
CL	4.98	2.86	0	10
Quit attempts	1.41	2.55	0	20
Smoking initiation age	16.30	3.60	9	34
SSC	2.16	1.01	0	4
ASC	2.13	1.13	0	4
Reactance	2.59	.96	1	5
PE	3.26	.85	1	5
Relevance	3.29	1.10	1	5

Note: n = 194

To explore the distribution of identification with the ASC and SSC in this sample, these variables were divided into categories representing those who disagreed (<2), were neutral (=2), or agreed (>2) that they identified with each self-concept. Table 23 summarizes these distributions. In this study, roughly half of the respondents agreed that they identified with the ASC, and roughly half of the respondents agreed that they identified with the SSC. The majority of respondents (29.4%) agreed that they identified with the SSC and disagreed that they identified with the ASC. Similar to Pilot 1, only 17.5% of respondents agreed that they identified with both the ASC and SSC, as compared to 25.8% in Study 1. Similar to Pilot 1, about one-quarter (25.3%) agreed that they identified with the ASC and disagreed that they identified with the SSC, s compared to only 12.9% in Study 1.

Thus, participants in this study were more similar in terms of their SSC and ASC ratings and distributions to those participants in Pilot 1 than to the sample in Study 1. The samples in the Pilot 1 and the present study were both were drawn from the same pool (M-Turk), but participants in Study 1 were drawn from SSI's pool. Thus, it is not surprising that these latter two samples are more similar to each other than either is to the sample in Study 1.

Table 23. Percent of participants by categorical identification with smoking-related self-concepts

	ASC			
SSC	Disagree	Neutral	Agree	Total
Disagree	8.3	2.6	25.3	36.1
Neutral	2.1	1.6	7.7	11.3
Agree	29.4	5.7	17.5	52.6
Total	39.7	9.8	50.5	

Correlational Analyses

Correlations between identification variables and the other variables included in the models are presented in Table 24. The ASC and SSC were significantly negatively correlated (r = -.44, p < .001). As identification with the SSC increased, participants reported higher scores on the FTND and lower scores on the CL. Thus, individuals who identified with the SSC also tended to be more dependent on nicotine and at lower stages of change along on the contemplation ladder to smoking cessation. Identification with the ASC was also significantly correlated with lower scores on the FTND, higher scores on the CL, and more quit attempts. Thus, individuals who identified with the ASC also tended to be less dependent on nicotine, further along on the contemplation ladder to smoking cessation, and had tried to quit more times.

Table 24. Pearson's correlations and *p*-values between participant characteristics and smoking-related self-concepts

	SSC	ASC
ASC	-.44***	
Reactance	.12	-.10
Cessation self-efficacy	-.17*	.33***
Cessation intentions	-.17*	.38***
FTND	.24***	-.34***
CL	-.31***	.42***
Quit attempts	-.06	.20*
Smoking initiation age	-.10	.03
Education (years)	-.05	.02
Income	-.07	-.02
Age	-.01	-.06
Hispanic	-.09	.06
Black/African American	.07	.06
Male	.06	.11
PE	-.15*	.21**
Relevance	-.01	.10
Reactance	.12	-.10

Note. *n* = 194. *p < .05; ** p < .01; p < .001.

Correlations between identification variables and the message evaluation measures show that as individuals increasingly identified with the SSC, they viewed smoking cessation messages as having lower PE. As they identified increasingly with the ASC, they viewed smoking cessation messages as having higher PE. There was no evidence that the smoking-related self-concepts were related to ratings of message relevance or reactance to the messages.

In line with the findings of the cross-section study (Study 1) and Pilot 1 (Studies 2, 3 & 4), individuals who identified more with the ASC had significantly higher smoking cessation self-efficacy (r = .33, p < .001) and intentions (r = .38, p < .001). Similar to Pilot 1, but unlike the cross-sectional study, those who identified more with the SSC had significantly lower smoking cessation self-efficacy (r = -.17, p < .05) and intentions (r = -.17, p < .05).

To evaluate whether these relationships persisted when accounting for other smoking-related characteristics, a GLM was fit using the method of least squares with ASC, SSC, and mean-centered exogenous variables representing smoking-related characteristics and participant demographics regressed onto smoking cessation intentions and self-efficacy. These models (Tables A41 and A42 in Appendix F) demonstrate that even when other predictors of smoking cessation outcomes are included, identification with the ASC continues to be significantly related to smoking cessation self-efficacy (B = .16, p < .05) and intentions (B = .11, p < .05). However, similar to the findings of the previous

studies, there is no evidence that the SSC is related to either smoking cessation self-efficacy (B = -.05, *ns*) or intentions (B = .06 x 10^{-3}, *ns*).

Value Content

The results indicated that the messages were effective at expressing their respective values. Table 25 presents the means, standard deviations, and planned contrast *p*-values comparing assessments of value content in self-direction and power expressive messages.

Table 25. Means, standard deviations, and planned contrast *p*-values of message evaluations by message value

	Self-Direction Message		Power Message			
	M	*SD*	*M*	*SD*	F^a	p^b
Self-direction content	4.18	.90	3.17	1.09	50.14	<.001
Power content	2.30	1.00	3.58	1.03	78.89	<.001
Relevance	3.49	1.03	3.10	1.14	6.35	.013

Note: a. Numerator *df* = 1, denominator *df* = 190. b. *p*-value for planned contrasts

Participants perceived the self-direction messages to have significantly higher self-direction content than the power messages. Participants perceived the power messages to have significantly higher power content than the self-

direction messages. These differences were substantial, and thus the messages were successful in expressing their target value content.

Relevance

Table 25 presents the means, standard deviations, and planned contrast *p*-values comparing relevance of the self-direction messages and the power messages. The results indicated that the self-direction messages had greater relevance to participants than the power messages. In line with predictions, messages that related to values that were more highly ranked by participants were perceived as more relevant to participants.

Reactance

Table 26 presents the means, standard deviations, and planned contrast *p*-values comparing reactance to the ASC frame and SSC frame messages. The results did not support the prediction that the ASC frame messages would produce less reactance than the SSC frame messages. Contrary to predictions, there was no evidence that reactance was lower for the ASC frame message as compared to the SSC frame messages.

Table 26. Means, standard deviations, and planned contrast *p*-values of reactance by message frame

	ASC Frame		SSC Frame			
	M	*SD*	*M*	*SD*	F^a	p^b
Reactance	2.60	.88	2.59	1.04	.01	.945

Note: a. Numerator *df* = 1, denominator *df* = 190. b. *p*-value for planned contrasts between conditions.

PE

Table 27 presents the means and standard deviations of PE ratings by study condition. Even though the *Self*-ASC condition message had the highest PE rating and the *Power-SSC* condition message had the lowest PE rating, there was no evidence that the messages differed significantly in terms of their mean PE based on study condition F (3,190) = .37, p = .78. Thus, the messages successfully varied their value content without varying their quality.

Table 27.Marginal means and standard deviations of PE by condition

	ASC Frame		SSC Frame		Marginal Means	
	M	*SD*	*M*	*SD*	*M*	*SD*
Self-Direction Message	3.36	.92	3.26	.74	3.31	.83
Power Message	3.25	.87	3.18	.87	3.22	.87
Marginal Means	3.30	.89	3.22	.81		

Discussion

The self-direction messages are expressive of self-direction values and the power messages are expressive of power values. These messages do not vary in perceived effectiveness, but as expected the self-direction messages are more relevant to participants. Thus, results of this study support that the messages effectively vary in their value content and relevance, without varying in the overall quality of the messages.

Messages that express content related to values that are prioritized (i.e. self-direction) are relevant to participants, and should be more persuasive than less relevant messages that express values that are not prioritized by participants (i.e. power). Self-direction expressive messages should be persuasive because they advocate smoking cessation behavior as achieving a value that is important to respondents. These outcomes of this study support that if these persuasive effects occur, they would not be related to the quality of the arguments in the messages, which would indicate a case-category confound.

Contrary to expectations, ASC frame messages do not reduce reactance compared to the SSC frame messages. In addition, there is no evidence that identification with the smoking related self-concepts has an impact on reactance to anti-smoking messages. Even though the SSC has a weak positive correlation with reactance and the ASC has a weak negative correlation with reactance,

neither of these relationships are significant. Thus there is not enough evidence in this study to conclude that the smoking-related self-concepts influence reactance to smoking cessation messages, or that ASC message frames reduce reactance as compared to SSC frames.

These unexpected results may have occurred because all smoking cessation messages produce reactance, regardless of their message frame. Differences in reactance to the ASC message frames and SSC message frames may be small compared to the effect of the message topic in general on participant reactance. Thus, it may difficult to reduce reactance to smoking cessation messages because they fundamentally are threatening to their viewers. However, ASC frame messages still have potential to increase the determinants of smoking cessation if they prime or change viewers identification with the ASC. Value- expressive messages that speak to the connection between the ASC and prioritized values may enhance the priming effects of ASC frames and persuade individuals to identify with the ASC. In turn, these messages would lead to increased smoking cessation intentions, self-efficacy, and attitudes.

On the other hand, SSC frame messages do not appear to have an effect on the SSC nor on the determinants of smoking cessation. Yet, it is important to gather further evidence ensuring that messages do not inadvertently prime the SSC. In addition, the persuasive effect of value- expressive messages with SSC frames may be enhanced when these messages speak to the negative

connection between the SSC and prioritized values. If these messages could persuade their viewers to decrease their identification with the SSC, then the determinants of smoking cessation would increase.

Chapter 7: STUDY 6 (Main Study)

The aims of Study 6 are to expose smokers to value-expressive smoking cessation messages with smoking-related self-concept frames and assess the impact of these messages on: (1) the determinants of smoking cessation and (2) identification with the smoking-related self-concepts. This study is a randomized web-based between-subjects post-only experiment with a two value (self-direction vs power) x two frame (ASC vs SSC) design, and a no-message control condition. Three determinants of smoking cessation are examined in this study: smoking cessation intentions, self-efficacy, and attitudes.

This study has several goals. The first goal of this study is to evaluate the effects of messages with the ASC or SSC frames on the determinants of smoking cessation. The second goal is to determine whether messages that are matched in content to smokers' highest-priority value (self-direction) are more effective at increasing the determinants of smoking cessation as compared to messages that are matched to their lowest-priority value (power). This study will also determine whether ASC frames have positive effects on these outcomes when combined with high priority (self-direction) value content. Finally, this study will evaluate the effects of these message features on identification with and salience of the smoking-related self-concepts.

The hypotheses evaluated in this study are:

Hypothesis 10: Compared to the *Control* condition, smoking cessation intentions, self-efficacy, and attitudes will be higher in the ASC frame conditions. There will be no evidence that the SSC Frame conditions affect smoking cessation intentions, self-efficacy, and attitudes as compared to the *Control* condition.

Hypothesis 11: Compared to the *Control* condition, smoking cessation intentions, self-efficacy, and attitudes will be higher in the self-direction conditions. There will be no evidence that the power conditions affect smoking cessation intentions, self-efficacy, and attitudes as compared to the *Control* condition.

Hypothesis 12: There will be an interaction effect between the self-direction condition and ASC message frame such that smoking cessation intentions, self-efficacy, and attitudes will be higher in the *Self-ASC* condition as compared to the *Control* condition.

Hypothesis 13: Compared to the *Control* condition, the beta weight of the ASC on smoking cessation intentions and self-efficacy will be higher in the ASC Frame conditions. There will be no evidence that the SSC Frame conditions affect the beta weight of the ASC on smoking cessation intentions and self-efficacy as compared to the *Control* condition.

Hypothesis 14: There will be an interaction effect between the self-direction condition and ASC frame condition such that the beta weight of the ASC on smoking cessation intentions, self-efficacy, and attitudes will be higher in the *Self-ASC* condition as compared to the *Control* condition.

Hypothesis 15: Compared to the *Control* condition, the mean level of identification with the ASC will be higher in the ASC frame conditions. There will be no evidence that the SSC Frame condition affects the mean level of identification with the ASC as compared to the *Control* condition. There will be an interaction effect between the self-direction value condition and ASC message frame condition such that the mean level of identification with the ASC will be higher in the *Self-ASC* condition as compared to the *Control* condition.

Based on the findings from Study 2, in addition to these hypotheses, it was expected that the data would not provide evidence against the null hypotheses that the study conditions have no affect either the strength of association between the SSC and the determinants of smoking cessation or the mean level of identification with the SSC.

Method

Participants

Data for this study was collected during February 2015. This study used a sample of English-speakers ages 18 and older living in the United States

recruited from Survey Sampling International's (SSI) national opt-in panel. SSI panel members were randomized to condition to participate in the current study through SSI's Dynamix sampling platform and email invitations. Respondents who completed the survey were compensated by SSI according to SSI's normal compensation options based on the length of the survey.

Respondents were eligible for the study if they were adults (ages 18+) who were current cigarette smokers: they reported having smoked at least 100 cigarettes in their lifetime and currently smoked every day (Centers for Disease Control and Prevention, 2011). Of 1,948 individuals who accepted the initial invitation to participate in the study, 91.3% (*n* = 1,720) smoked at least 100 cigarettes in their life and 7.5% (*n* = 142) reported that they were "unsure" if they had smoked 100 cigarettes in their life. Of those, 70.4%% (*n* =1,371) were regular daily smokers and thus qualified for the study. Of the qualified participants, 92.2% (n = 1,264) completed the survey.

Research Design

This study was an online experiment hosted by Qualtrics, LLC. Participants could complete the surveys on any computer with an internet connection. On average, the survey took 13.6 minutes to complete (*SD* = 17.2 minutes).

Figure 8. Schematic of Study 6

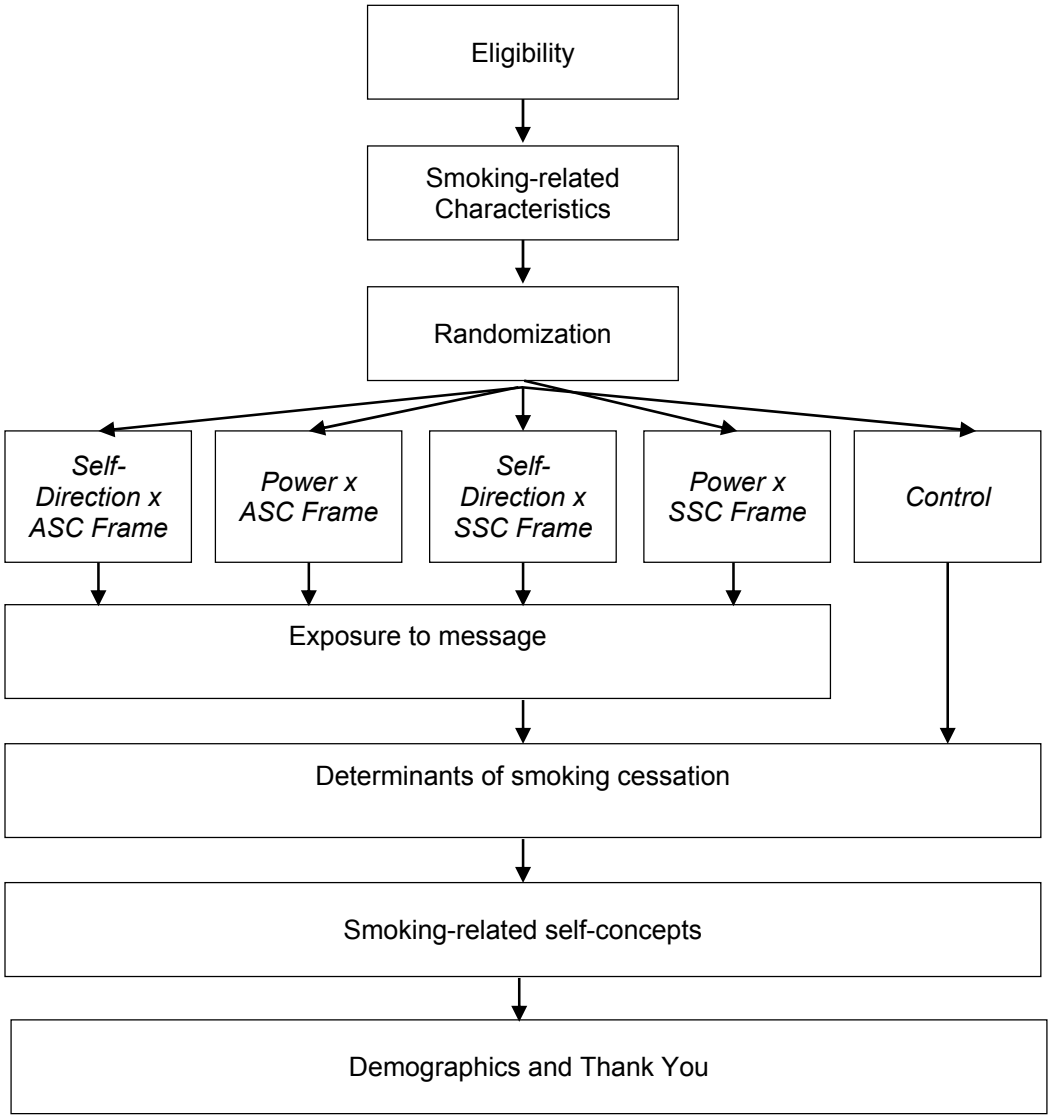


Figure 8 shows a schematic of the flow of the study. After providing consent and determining eligibility for the study, participants answered items assessing gender and smoking-related characteristics. Participants were then randomly assigned to one of five conditions: (1) self-direction value x ASC frame (*Self-ASC*), (2) self-direction value x SSC frame (*Self-SSC*), (3) power value x ASC frame (*Power-ASC*), (4) power value x SSC frame (*Power-SSC)*, or (5) no-message control (*Control).* Participants were then informed that they would be viewing a message that may be used sometime in the future. After viewing the message, participants answered items assessing smoking cessation intentions, self-efficacy, and attitudes; and identification with the ASC and SSC.

All participants then answered demographic items and were thanked for their participation in the study. Participants who completed the survey were re-routed to SSI's website for compensation.

Messages

The messages were presented as a video of a PowerPoint presentation. The text of the messages used in this study was taken from Study 5 and modified for presentation in the format of a video. Images of the messages as they appeared to participants can be found in Appendix E.

Measures

Demographics. Respondent characteristics collected consisted of demographic characteristics including age, gender, race/ethnicity (recoded as African American, White, or Other), Hispanic origin (recoded as Hispanic or not), years of educational attainment, and income.

Smoking-related characteristics. Four smoking-related characteristics were collected: nicotine dependence, stage of change, number of quit attempts, and age at smoking initiation.

To measure the intensity of participants' physical dependence on nicotine, the Fagerström Test for Nicotine Dependence was used (FTND, Heatherton et al., 1991). The FTND has six items assessing: (a) number of cigarettes smoked per day, (b) how soon one smokes a cigarette after waking, (c) whether one smokes when they are ill, (d) ability to refrain from smoking in places where smoking is forbidden, (e) whether one considers the first cigarette of the day as the most difficult to give up, and (f) whether one smokes more frequently during the first hour after waking. A higher score on the scale indicates stronger physical dependence on nicotine.

Participant's level of readiness to quit smoking was measured according to the transtheoretical model (TTM; Prochaska & DiClemente, 1983) using a modified version of the Ladder of Contemplation (CL, Biener & Abrams, 1991).

Participants were asked to choose a number between 0 and 10 indicating where they were in thinking about quitting smoking. Five numbers on the ladder were marked as points: 0 read ‘I have no thoughts about quitting smoking’; 2 read ‘I think I need to consider quitting smoking someday’; 5 read ‘I think I should quit smoking but I’m not quite ready’; 8 read ‘I am starting to think about how to reduce the number of cigarettes I smoke a day’; and 10 read ‘I am taking action to quit smoking’. A higher score on the CL indicated greater interest in smoking cessation.

To measure past smoking cessation attempts, participants were asked how many times they had stopped smoking for one day or longer because they were trying to quit smoking in the past twelve months. As well, participants were asked how old they were when they smoked their first whole cigarette.

Smoking cessation intentions. Individuals were asked to respond to five behavioral intention items on a 4-point scale (1 = definitely will not, 4 = definitely will). Items asked participants how likely it was in the next three months they would: try to quit smoking completely, reduce the number of cigarettes smoked in a day, quit smoking completely, call a smoking quit-line, and talk to someone about quitting smoking. These items were averaged into an overall measure of smoking cessation intentions (α = .88).

Smoking cessation self-efficacy. Self-efficacy to engage in smoking cessation behaviors was assessed with five items asking participants to indicate how sure they were that they could engage in behaviors in the next three months on a 4-point scale (1 = not at all sure, 4 = completely sure). Individuals reported their self-efficacy to: quit smoking completely, avoid smoking when they were craving a cigarette, avoid smoking they were around friends who were smoking, avoid smoking when they were feeling agitated or tense, and avoid smoking when someone offered them a cigarette. These items were averaged into an overall measure of smoking cessation self-efficacy (α = .92).

Smoking Cessation Attitudes. To assess participant attitudes towards smoking cessation, participants were asked to indicate their response on a 10-point semantic differential scale to six items asking whether quitting smoking in the next three months would be: ‘‘good or bad,’ ‘enjoyable or unenjoyable,’ ‘pleasant or unpleasant,’ ‘foolish or wise,’ ‘beneficial or harmful,’ and ‘easy or difficult.’ These items were averaged into a measure indicating overall attitudes towards smoking cessation (α = 0.75), with a higher score indicating more positive attitudes.

Smoking-related self-concepts. ASC and SSC were measured using a modified version of previously validated scales (Falomir & Invernizzi, 1999; Shadel & Mermelstein, 1996). To determine the magnitude of identification with the SSC, participants were asked to indicate their level of agreement on a 5-point

scale (0 = strongly disagree, 4 = strongly agree) with three items: “Smoking is a part of my self-image,” “Smoking is part of my personality,” and “I think of myself as someone who is a smoker.” These three items were averaged into an overall score indicating identification with the SSC (α = .0.88).

To determine the magnitude of identification with the ASC, participants were asked to indicate their level of agreement on a 5-point scale (0 = strongly disagree, 4 = strongly agree) with three items: “I am able to see myself as a non-smoker,” “It is easy to imagine myself as a non-smoker,” and “I am comfortable with the idea of being a non-smoker.” These items were averaged into a measure indicating overall identification with the ASC (α = .0.88).

Analysis

GLMs fit using the method of least squares evaluated the effects of the message conditions on smoking cessation intentions, self-efficacy, attitudes, ASC, and SSC respectively. For all models, planned contrasts compared the least squares means between the focal condition and the *Control* condition.

To evaluate the main effects of the ASC frame conditions, planned contrasts compared means between the *Control* condition and the average of the *Self-ASC* and *Power-ASC* conditions. To evaluate the main effects of the SSC frame conditions, planned contrasts compared the means between the *Control* condition and the average of the *Self-SSC* and *Power-SSC* conditions. To

evaluate the main effects of self-direction conditions, planned contrasts compared means between the *Control* condition and the average of the *Self-ASC* and *Self-SSC* conditions. To evaluate the main effects of power conditions, planned contrasts compared the means between the *Control* condition and the average of the *Power-ASC* and *Power-SSC* conditions. To evaluate the effects of the *Self-ASC* condition, planned contrasts compared the simple means between the *Control* condition and the *Self-ASC* condition.

Priming effects of the study conditions were assessed by examining the strength of association between the smoking-related self-concepts and the determinants of smoking cessation (Fishbein & Yzer, 2003). A GLM was fit with each of the determinants of smoking cessation as the outcome and a categorical variable representing study condition as the independent variable. To determine whether study condition influenced the strength of association between smoking-related self-concepts and each of the determinants of smoking cessation, interaction terms between the ASC or SSC and the study conditions were included in the model. A significant difference in the interaction terms between each of the smoking-related self-concepts and the study condition suggested evidence of a priming effect.

All analysis was conducted using SAS Version 9.3. Where data were missing, list-wise deletion was used due to few missing values.

Table 28. Study 6 participant characteristics

Variable	*M* (%)	*SD*	Min.	Max.
Age	43.53	14.22	18	80
Female (%)	49.2			
Black/ African-American (%)	8.8			
Hispanic/ Latino (%)	7.6			
Education (years)	14.24	2.07	0	18
Income (thousands of dollars)	57.10	39.48	12.5	175
FTND	4.76	2.18	0	10
CL	5.79	3.01	0	10
Quit attempts	2.25	4.94	0	60
Smoking initiation age	16.51	4.69	1	58
SSC	1.98	1.03	0	4
ASC	2.53	1.02	0	4
Smoking cessation self-efficacy	2.46	.75	1	4
Smoking cessation intentions	2.18	.92	1	4
Smoking cessation attitudes	6.61	1.91	0	10

Note: *n* = 1,207

Results

Descriptive Results

Among 1,266 qualified participants who completed the survey, 59 respondents (4.7%) did not have a match between their reported year of birth and their age and as a quality control measure are excluded from the analysis. Thus, a total of 1,207 participants were included in the sample for this study.

The distributions of demographics and variables among participants who completed the study are summarized in Table 28. The sample consisted of regular smokers between 18 and 80 years of age (M = 43.53, SD = 14.22). Roughly half of the participants were female (49.2%) with representation among Hispanic (6.7%) and African-American (7.6%) participants. Participants completed an average of 14.24 years of education (SD = 2.07), and earned an average of 57.10 thousand dollars per year (SD = 30.79 thousand dollars).

Participants generally neither agreed nor disagreed that they identified with the SSC (M = 1.98, SD = 1.03) and slightly agreed that they identified with the ASC (M = 2.53, SD = 1.02). Participants were on average at the midpoint of the FTND (M = 4.76, SD = 2.18) and CL (M = 5.79, SD = 3.01) and attempted to quit smoking in the past year between 0 and 60 times (M = 2.25, SD = 4.94), with most common number of quit attempts being zero. Participants initiated smoking at a median age of 16 years (M = 16.51, SD = 4.69). Participants most commonly

reported that they are ‘somewhat sure’ that they have self-efficacy to quit smoking (*M* = 2.46, *SD* = 1.04) and that they ‘probably will’ engage in smoking cessation behaviors (*M* = 2.46, *SD* = 1.02).

Table 29. Percent of participants by categorical identification with smoking-related self-concepts

	ASC			
SSC	Disagree	Neutral	Agree	Total
Disagree	5.8	4.5	30.5	40.8
Neutral	3.3	5.5	10.1	18.9
Agree	11.1	5.1	24.1	40.4
Total	20.2	15.1	64.7	

To explore the distribution of identification with the ASC and SSC in this sample, these variables were divided into categories representing those who disagreed (<2), were neutral (=2), or agreed (>2) that they identified with each self-concept. Table 29 summarizes these distributions. There were roughly equal numbers of respondents who agreed and disagreed that they identified with the SSC. About two-thirds (64.7%) of participants were agreed that they identified with the ASC. The majority (30.5%) of respondents agreed that they identified with the ASC but disagreed that they identified with the SSC. About a quarter of participants (24.1%) agreed that they identified with both the ASC and SSC, and

only 11.1% agreed that they identified with the SSC but disagreed that they identified with the ASC.

Correlational Analyses

Correlations between identification variables and the other variables measured in this study are summarized in Table 30. The ASC and SSC were significantly negatively correlated (r = -.19, p < .001). Individuals who more strongly identified with the SSC tended to be more dependent on nicotine and at lower stages of change along on the contemplation ladder to smoking cessation. As identification with the SSC increased, participants reported higher scores on the FTND (r = .17, p < .001) and lower scores on the CL (r = -.07, p < .05). Individuals who identified more strongly with the ASC were further along the contemplation ladder to smoking cessation, had attempted to quit more times, and started smoking at a later age. Identification with the ASC was significantly correlated with higher scores on the CL (r = .50, p < .001) and a later smoking initiation age (r = .15, p < .001). In this study, identification with the ASC was not correlated with FTND scores, and the SSC was significantly correlated with more quit attempts.

Table 30. Pearson's correlations and *p*-values between participant characteristics and smoking-related self-concepts

	SSC	ASC
ASC	-.19***	
Cessation self-efficacy	.03	.51***
Cessation intentions	-.03	.58***
Cessation attitudes	-.10***	.57***
FTND	.17***	-.02
CL	-.07*	.50***
Quit attempts	.11***	.16***
Smoking initiation age	-.03	.15***
Education (years)	.07*	.06*
Income	.08**	.14***
Age	-.09**	-.17***
Hispanic	-.03	-.04
Black/African American	.01	.06*
Male	.15***	-.04

Note. *n* = 1,207. *p < .05; ** p < .01; p < .001.

In line with the findings of the first three studies, individuals who identified with the ASC had significantly higher smoking cessation self-efficacy (r = .51, p < .001) and intentions (r = .58, p < .001). Similar to the findings in the cross-sectional study (Study 1), but contrary to Pilot 1 (Studies 2, 3, & 4) the bivariate correlation suggested that identification with the SSC was unrelated to smoking cessation intentions (r = -.03, p = .26) or smoking self-efficacy (r = .03, p = .30).

To evaluate whether these relationships persisted when accounting for other smoking-related characteristics, a GLM was fit using the method of least squares with ASC, SSC, and mean-centered exogenous variables representing smoking-related characteristics and participant demographics regressed onto smoking cessation intentions and self-efficacy. These models (Tables A43 and A44 in Appendix F) demonstrate that even when other predictors of smoking cessation outcomes are included, identification with the ASC continues to be significantly related to smoking cessation self-efficacy (B = .40, p < .0.001) and intentions (B = .27, p < .0.001). Once these variables were accounted for, identification with the SSC had a small but significant positive relationship with smoking cessation self-efficacy (B = .09, p < .0.001) and intentions (B = .03, p < .0.001). These results mirror the findings of Study 1, where when the ASC and SSC were included in the same model, the SSC had a slight positive relationship with smoking cessation intentions (B = .08, p < .0.001).

The variation in the relationship between the SSC and the outcomes between the studies may in part be attributed to the fact identification with the ASC was higher in this study (M = 2.53, SD = 1.02) and in the cross-sectional study (Study 1) (M = 2.61, SD = 1.03), as compared to Pilot 1 (Studies 2, 3, & 4) (M = 2.19, SD = 1.00) and Pilot 2 (Study 5) (M = 2.13, SD = 1.02). Even though other demographic variables and smoking related characteristics did not vary notably between the samples, the increased agreement with the ASC may in part explain why in those studies, the SSC had a non-significant bivariate relationship with smoking cessation self-efficacy and intentions, and a slightly positive relationship once the effects of ASC were included in the model. In addition, the sample in this study and in the cross-sectional study was drawn from the SSI pool, while the other studies relied on Amazon MTurk samples. The impact of these different sampling frames may account for the differences observed.

Randomization and attrition

To determine whether randomization to conditions was successful, the conditions were compared by participant age, education, income, nicotine dependence (FTND), stage of change (CL), number of quit attempts, and age at smoking initiation using ANOVA with a categorical variable representing each of the five conditions as the independent variable. The results did not indicate that there were significant differences by condition for participant age $F(4,1202) = .34$, $p = .85$, education $F(4,1202) = 1.44$, $p = .22$, income $F(4,1200) = .08$, $p = .99$,

FTND $F(4,1202) = 1.04$, $p = .39$,CL $F(4,1202) = .32$, $p = .87$, number of quit attempts $F(4,1202) = .20$, $p = .94$, or age at smoking initiation $F(4,1202) = 1.01$, $p = .40$. Thus, randomization to conditions was successful.

A total of 79 respondents did not complete the study. Of those, 32.9% (n = 26) dropped out during the screening questions, 50.6% (n = 40) dropped out during the video manipulation, and the remaining 16.5% (n = 13) dropped out after the video but before they completed the survey. To evaluate whether attrition across study conditions was homogeneous, the logit version of the ordinal regression model was used with dropout rate (dichotomized as 0 for drop out, and 1 as complete) as the dependent variable, and study condition as the independent variable.

Results from a logistic regression analysis show that the likelihood of dropping out of the study was influenced by study condition Wald's χ^2 (4) = 10.97, $p = .027$. Single degree of freedom contrasts between the message conditions and the *Control* condition showed that compared to the *Control* condition, respondents were significantly more likely to drop out in the *Power-SSC*, χ^2 (1) = 8.69, $p = .003$ and the *Self-SSC* χ^2 (1) = 11.57, $p < .001$ conditions. Compared to the no-message *Control* condition, the odds of dropping out were 76.1% higher for respondents in the *Power-SSC* condition (B = -1.22, p = .003*)* and 60.6% higher in the *Self-SSC* condition (B = -.9314, p = .029*)*. Contrasts between the SSC frame and ASC frame conditions showed that

participants in the SSC frame conditions were significantly more likely to drop out of the study as compared to participants in the ASC frame conditions χ^2 (1) = 4.30, p = .038. No significant differences from the *Control* condition were found in dropout rates for respondents in the *Self-ASC* or *Power-ASC* conditions.

These results suggest that the SSC frame messages led to overall higher dropout rates as compared to the *Control* condition and to the ASC frame messages. The differential attrition between study conditions has implications for the internal validity of the study. Because the SSC and ASC were measured after exposure to the manipulation, there is no way to determine whether these characteristics differed between the participants who dropped out in the various study conditions. It may be that individuals who identified more or less strongly with the ASC or SSC were more likely to drop out of the SSC conditions, which would bias the results of the study.

To gather further evidence to assess this possibility, a GLM was built using the findings from the previous study to predict the degree to which participants identified with the ASC and SSC from their demographic and smoking related characteristics. The results of the models (Table A46 in Appendix F) showed that FTND, CL, quit attempts, smoking initiation age, and Race (Black vs not) explained 14.4% of the variance in identification with the ASC and 10.5% of the variance in identification with the SSC. To evaluate whether attrition differed based on these characteristics, a logit version of the

ordinal regression model was used with dropout rate (dichotomized as 1 for drop out, and 0 as complete) as the dependent variable, and FTND, CL, quit attempts, smoking initiation age, and race as the independent variables. Interaction terms between these variables and the study conditions were entered into the model to determine whether the study conditions impacted these outcomes. The results suggested that the odds of dropping out were higher as respondents were farther along the CL (B = .1584, p < .001*)* and lower as respondents reported making more quit attempts (B = -.0435, p < .01). However, non-significant interaction terms between the CL and the study conditions, and between quit attempts and the study conditions, suggested that this likelihood did not differ between the study conditions.

Taken together, these analyses do not rule out that as participants identified more strongly with the ASC or SSC, they were more likely to drop out of the study. However, it appears that the study condition did not impact this dropout rate differentially. For example, as participants were farther along the CL, they were equally more likely to drop out of any of the study conditions. Thus, though the dropout rates differed between the study conditions, it does not appear that these participants differed in their smoking-related self-concepts from those who remained in the study. However, the results of the remaining analysis must be interpreted with caution.

Determinants of Smoking Cessation

Smoking cessation intentions. It was predicted that the ASC frame conditions and the self-direction conditions would have main effects such that smoking cessation intentions would be significantly higher in these conditions compared to the *Control* condition. It was also predicted that be an additive effect of the ASC message frames with self-direction value content such that smoking cessation intentions would be higher in the *Self-ASC* condition as compared to the *Control* condition. It was expected that there would be no evidence that smoking cessation intentions were affected by either the SSC frame conditions or the power conditions as compared to the *Control* condition.

Table 31. Means and standard deviations of smoking cessation intentions by message value and frame

	ASC Frame		SSC Frame		Marginal Means	
	M	*SD*	*M*	*SD*	*M*	*SD*
Self-Direction Messages	2.47	.74	2.46	.75	2.47	.74
Power Messages	2.40	.77	2.50	.72	2.45	.75
Marginal Means	2.43	.76	2.48	.73		
				Control	2.45	.76

Means and standard deviations of smoking cessation intentions by study condition are summarized in Table 31. Contrary to predictions, planned contrasts

did not indicate a significant main effect of the ASC frame conditions on smoking cessation intentions, F (1, 1202) = .14, p = .71. Nor did planned contrasts indicate a significant main effect of self-direction content on this outcome, F (1, 1202) = .04, p = .84. There was also no evidence that smoking cessation intentions were higher when the ASC frame condition interacts with self-direction content as compared to the *Control* condition, F(1,1202) = .04, p = .85.

As expected, there was also no evidence that the SSC frames impact smoking cessation intentions, F (1, 1202) = .20, p = .66 or that power content impacts smoking cessation intentions, F (1, 1202) = .02, p = .90.

Smoking cessation self-efficacy. It was predicted that as compared to the *Control* condition, smoking cessation self-efficacy would be significantly higher in the ASC frame conditions. It was also predicted that self-efficacy would be higher in the self-direction conditions as compared to the *Control* condition, and that there would be an interaction between the ASC message frames and self-direction condition such that smoking cessation self-efficacy would be highest in the *Self-ASC* condition. No evidence was expected that smoking cessation intentions were affected by either the SSC frame conditions or the power conditions as compared to the *Control* condition.

Marginal means and standard deviations of smoking cessation self-efficacy by study condition are summarized in Table 32. Contrary to predictions,

planned contrasts did not indicate that smoking cessation self-efficacy was significantly different in the ASC frame conditions as compared to the *Control* condition, $F(1,1202) = .08$, $p = .78$. Nor did planned contrasts indicate a significant main effect of self-direction content on this outcome, $F(1, 1202) = .72$, $p = .40$. There was also no evidence of an interaction affect between the ASC frame and self-direction content on smoking cessation self-efficacy as compared to the *Control* condition, $F(1,1202) = .03$, $p = .86$.

As expected, there was no evidence that the SSC frame conditions impacted smoking cessation self-efficacy as compared to the *Control* condition, $F(1,1202) = 1.89$, $p = .66$. There was also no evidence that power content impacted smoking cessation self-efficacy, $F(1, 1202) = .65$, $p = .42$.

Table 32. Means and standard deviations of smoking cessation self-efficacy by message value and frame

	ASC Frame		SSC Frame		Marginal Means	
	M	*SD*	*M*	*SD*	*M*	*SD*
Self-Direction Messages	2.15	.90	2.24	.91	2.20	.91
Power Messages	2.16	.93	2.23	.93	2.19	.93
Marginal Means	2.16	.91	2.23	.92		
				Control	2.14	.95

Smoking cessation attitudes. It was predicted that there would be two main effects of message frames and message value content such that smoking cessation attitudes would be significantly higher in the ASC frame conditions and in the self-direction conditions as compared to the *Control* condition. It was also predicted that there would be an interaction between ASC frames and self-direction content such that smoking cessation attitudes would be highest in the *Self-ASC* condition. It was not expected that either the SSC frame conditions or the power conditions would affect smoking cessation attitudes as compared to the *Control* condition.

Table 33. Means and standard deviations of smoking cessation attitudes by message value and frame

	ASC Frame		SSC Frame		Marginal Means	
	M	*SD*	*M*	*SD*	*M*	*SD*
Self-Direction Messages	6.64	1.84	6.67	1.82	6.66	1.83
Power Messages	6.51	1.97	6.69	1.93	6.60	1.95
Marginal Means	6.58	1.91	6.68	1.87		
				Control	6.52	1.99

Marginal means and standard deviations of smoking cessation attitudes by study condition are summarized in Table 33. Contrary to predictions, planned contrasts did not indicate a significant main effect of the ASC frame on smoking

cessation attitudes, *F* (1, 1202) = .15, *p* = .70. Nor did planned contrasts indicate that attitudes in the self-direction conditions differed from those in the *Control* condition, *F* (1, 1202) = .86, *p* = .35. There was also no evidence that the interaction of the ASC frame with self-direction content had an effect on attitudes as compared to the *Control* condition, *F*(1,1202) = .49, *p* = .48.

As expected, there was also no evidence that smoking cessation attitudes were impacted by the SSC frame conditions as compared to the *Control* condition, *F*(1,1202) = 1.18, *p* = .28. As compared to the *Control* condition, there was also no evidence that power content impacted smoking cessation attitudes, *F* (1, 1202) = .30, *p* = .58.

Persuasion effects

Identification with the ASC. It was predicted that the ASC frame messages would increase the mean levels of identification with the ASC above the *Control* condition. It was predicted that the effects of the ASC frames on identification with the ASC would be strongest when the message included self-direction content. It was not expected that the SSC frame messages would affect these means as compared to the *Control* condition.

Means and marginal means for the ASC in the 2 value (self-direction vs power) x 2 frame (ASC vs SSC) conditions, and the *Control* condition are shown in Table 34. Contrary to predictions, mean identification with the ASC was not

significantly different in the ASC frame conditions from the *Control* condition, F (1, 1202) = .39, p = .53. As expected, there was also no evidence that SSC frame conditions impacted mean identification with the ASC, F (1, 1202) = 2.27, p = .13. Mean identification with the ASC was also not significantly different in the *Self-ASC* condition as compared to the *Control* condition, F(1,1202) = 1.36, p = .24. Thus, there was no evidence that messages with either ASC or SSC frames changed participants mean levels of identification with the ASC above that of the *Control* condition or of an interaction effect between these two conditions on identification with the ASC.

Table 34. Means and standard deviations of identification with the ASC by message value and frame

	ASC Frame		SSC Frame		Marginal Means	
	M	*SD*	*M*	*SD*	*M*	*SD*
Self-Direction Messages	2.57	1.03	2.54	.99	2.56	1.01
Power Messages	2.46	1.06	2.63	.95	2.55	1.00
Marginal Means	2.52	1.04	2.59	.97		
				Control	2.47	1.07

Identification with the SSC. Means and marginal means for the SSC in the 2 value (self-direction vs power) x 2 frame (ASC vs SSC) conditions, and the *Control* condition are shown in Table 35. Mean identification with the SSC was

not significantly impacted by the SSC frame conditions as compared to the *Control* condition, $F(1,1202) = .05$, $p = .82$, and thus there was no evidence that SSC frames persuaded viewers to change their mean identification with the SSC. As expected, there was also no evidence that mean identification with the SSC was impacted by ASC frame messages as compared to the *Control* condition, $F(1,1202) = 1.68$, $p = .20$.

However, persuasive effects did occur in the *Self-ASC* condition. Mean identification with the SSC was significantly lower in the *Self-ASC* condition as compared to the *Control* condition, $F(1,1202) = 4.82$, $p = .03$. These results suggest that rather than increasing identification with the ASC as predicted, the *Self-ASC* condition reduced identification with the SSC.

Table 35. Means and standard deviations of identification with the SSC by message value and frame

	ASC Frame		SSC Frame		Marginal Means	
	M	*SD*	*M*	*SD*	*M*	*SD*
Self-Direction Messages	1.81*	1.02	2.00	1.06	1.90	1.04
Power Messages	2.01	1.00	2.07	1.01	2.04	1.01
Marginal Means	1.91	1.01	2.03	1.03		
				Control	2.02	1.04

Priming effects

Priming the ASC. It was predicted that compared to the *Control* condition, the ASC frame conditions would prime the relationship between the ASC and the determinants of smoking cessation. It was also predicted that the priming effects would be stronger when the ASC frames were combined with self-direction content. It was not expected that there would be evidence that the SSC frame conditions had priming effects on the relationship between the ASC and the determinants of smoking cessation.

Table 36. Correlation coefficients between identification with the ASC and determinants of smoking cessation within study conditions

	Self-ASC *n = 234*	*Power-ASC* *n = 239*	*Self-SSC* *n = 248*	*Power-SSC* *n = 230*	*Control* *n = 256*
Intentions	.52	.52	.57	.57	.59
Self-Efficacy	.53	.41	.53	.49	.53
Attitudes	.54	.52	.55	.54	.61

Pearson's product moment correlation coefficients between the ASC and each of the three determinants of smoking cessation are presented in Table 36, sorted by study condition. Fisher Z transformations evaluated the significance of the differences between the correlation coefficients for each condition compared

to the *Control* condition. Correlation analysis suggested that in the *Control* condition, the ASC had an expected strong positive relationship with smoking cessation intentions, self-efficacy, and attitudes. This positive relationship was apparent in all the study conditions. Fisher Z transformation suggested that there were no significant differences in the strength of the relationships between the ASC and the determinants of smoking cessation in any of the study conditions as compared to the *Control* condition. Thus, the correlation analysis suggested that priming of the ASC did not occur.

To evaluate the significant of the priming effects of the messages on the ASC taking into account the variance in these measures, the beta weights of the ASC on the determinants of smoking cessation were compared between each of the study conditions and the *Control* condition within the framework of a GLM. Evidence of a priming effect would be if the ASC beta weight was greater in the study conditions as compared to the ASC beta weight in the *Control* condition. Table 37 summarizes these outcomes

As suggested by the correlation analysis, the GLM results validated that there was a significant and strong positive relationship between the ASC and the determinants of smoking cessation in the *Control* condition. There was no evidence that the ASC frame conditions impacted the relationship between the ASC and smoking cessation intentions, self-efficacy, or attitudes. The SSC frame

conditions also did not impact these relationships. Thus, there was no evidence of priming effects on the ASC in any of the study conditions.

Table 37. Estimated coefficients of GLM predicting determinants of smoking cessation from the ASC and study condition (standard errors in parentheses)

	Intentions	Self-Efficacy	Attitudes
Variables	*B (se)*	*B (se)*	*B (se)*
ASC	.42***	.47***	1.12***
	(.04)	(.05)	(.09)
ASC x Self-ASC	-.02	-.01	-.16
	(.05)	(.07)	(.14)
ASC x Power-ASC	.03	-.05	-.02
	(.05)	(.07)	(.13)
ASC x Self-SSC	.01	.02	-.09
	(.05)	(.07)	(.14)
ASC x Power-ASC	.01	.00	.00
	(.06)	(.07)	(.14)
ASC x Control	---	---	
Study Condition			
Self-ASC	.01	-.02	.40
	(.14)	(.19)	(.37)
Power-ASC	-.13	.14	.06

	(.14)	(.18)	(.36)
Self-SSC	-.04	.03	.29
	(.14)	(.19)	(.37)
Power-ASC	-.06	.02	-.01
	(.15)	(.20)	(.39)
Control	---	---	
Intercept	1.43***	.99***	3.75***
	(.10)	(.13)	(.25)
Adjusted R^2	.34	.26	.33
F value	67.50***	46.12***	65.70***

Note. n = 1,202. *** $p < .001$.

Priming the SSC. It was expected that there would be no evidence that any of the study conditions prime the relationship between the SSC and the determinants of smoking cessation compared to the *Control* condition.

Pearson's product moment correlation coefficients between the SSC and each of the three determinants of smoking cessation are presented in Table 38, sorted by study condition. Fisher Z transformations evaluated the significance of the differences between the coefficients for each condition and the control condition. Correlation analysis suggested that in the *Control* condition, the SSC had a weak positive relationship with smoking cessation self-efficacy and intentions, and a weak negative relationship with smoking cessation attitudes.

However, these associations were not significantly different from zero. Thus, similar to the findings of the previous studies, there was no evidence that the SSC had a relationship with the determinants of smoking cessation.

However, the correlation analysis suggested that the relationship between the SSC and the determinants of smoking cessation was significant and negative in one of the study conditions: the *Self-ASC* condition. Thus, the non-significant relationship between the SSC and each of the determinants of smoking cessation became a moderate negative relationship in the *Self-ASC* condition. Fisher Z transformation outcomes showed that these changes were significant (Table 38).

Table 38. Correlation coefficients between identification with the SSC and determinants of smoking cessation within study conditions

	Self-ASC *n = 234*	*Power-ASC* *n = 239*	*Self-SSC* *n = 248*	*Power-SSC* *n = 230*	*Control* *n = 256*
Intentions	-.23***	-.05	-.10*	-.11*	.09
Self-Efficacy	-.17**	.11	-.06	-.01	.11
Attitudes	-.30**	-.06	-.16	-.09	-.04

Note. * $p < .05$, ** $p < .01$, *** $p < .001$, for comparison between each condition and the C*ontrol* condition using Fisher Z transformations.

Table 39. Estimated coefficients of GLM predicting determinants of smoking cessation from the ASC and study condition (standard errors in parentheses)

	Intentions	Self-Efficacy	Attitudes
Variables	*B (se)*	*B (se)*	*B (se)*
SSC	.07	.10	-.08
	(.04)	(.06)	(.11)
SSC x Self-ASC	-.20**	-.24**	-.45**
	(.07)	(.08)	(.17)
SSC x Power-ASC	-.10	-.02	-.11
	(.07)	(.08)	(.17)
SSC x Self-SSC	-.09	-.08	-.06
	(.06)	(.08)	(.16)
SSC x Power-ASC	-.09	-.05	.03
	(.07)	(.08)	(.17)
SSC x Control	---	---	
Study Condition			
Self-ASC	.39**	.47**	.92*
	(.14)	(.18)	(.36)
Power-ASC	.14	.06	.22
	(.15)	(.18)	(.38)
Self-SSC	.19	.27	.28

	(.14)	(.18)	(.37)
Power-ASC	.23	.20	.12
	(.15)	(.19)	(.39)
Control	---	---	
Intercept	2.32***	1.93***	6.67***
	(.10)	(.13)	(.26)
Adjusted R^2	.01	.01	.02
F value	1.42*	1.56*	2.73**

Note. n = 1,202.* $p < .05$; ** $p < .01$;*** $p < .001$.

Table 39 summarizes the results of the GLM model evaluating these priming effects. The results suggested that compared to the *Control* condition, the beta-weight of the SSC was significantly lower in the *Self-ASC* condition for all three determinants of smoking cessation. Though the SSC was not a predictor of smoking cessation intentions, self-efficacy, and attitudes in the *Control* condition; the SSC became a significant (negative) predictor of these outcomes in the *Self-ASC* condition. This outcome suggests that priming of the SSC occurred in the *Self-ASC* condition.

Interestingly, controlling for identification with the SSC revealed that the *Self-ASC* condition led to significantly higher smoking cessation intentions, self-efficacy, and attitudes as compared to the *Control* condition. Thus, the SSC

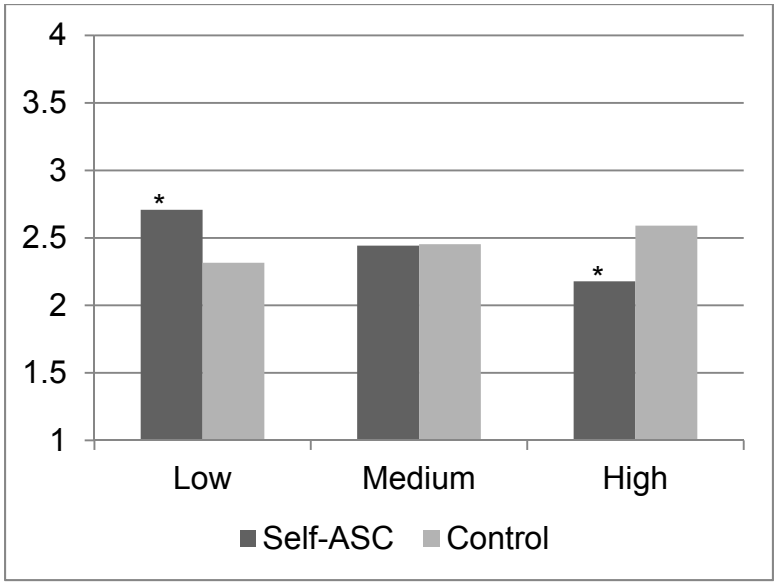
moderated the impact of the *Self-ASC* condition on the outcomes. Post-hoc tests in the next section further evaluated the moderating effects of the SSC.

Post-Hoc Analysis: Moderating Effects of SSC

To explore the moderating effects of identification with the SSC on the impact of the study conditions on the determinants of smoking cessation, post-hoc analyses were conducted. Post-hoc tests in a 3 level-of-identification (low, medium, high) x 5 condition GLM compared the predicted least-square means for the determinants of smoking cessation between the message conditions respective to the *Control* condition. Because all post-hoc comparisons involved the *Control* condition, the Dunnett (1955) test was used to control for the probably of Type I error.

Smoking cessation intentions. Results show that when identification with the SSC was taken into account, smoking cessation intentions were significantly impacted by the Self-ASC condition. For those who were low in identification with the SSC, the Self-ASC condition led to significantly higher smoking cessation intentions compared to the Control condition (M= 2.71 vs M = 2.32, adjusted p = .022). On the other hand, for those who were high in identification with the SSC, these effects were reversed and the Self-ASC condition led to significantly lower smoking cessation intentions (M= 2.18 vs M = 2.59, adjusted p = .026). Figure 9 graphically presents the predicted least square means of smoking cessation intentions by level of identification with the SSC.

Figure 9. Predicted least square means of smoking cessation intentions by identification with the SSC

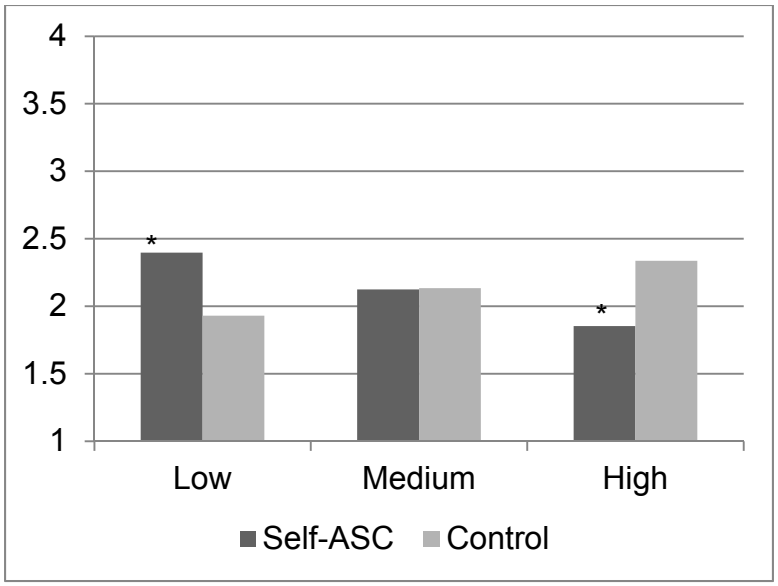


Note. For all comparisons, *df* = 1197. *$p < .05$ compared to the *Control* condition by Dunnett's test.

Smoking cessation self-efficacy. Once identification with the SSC was taken into account, smoking cessation self-efficacy was significantly impacted by the Self-ASC condition. Post-hoc analysis with Dunnett's contrasts showed that for those who were low in identification with the SSC, the Self-ASC condition led to significantly higher smoking cessation self-efficacy (M= 2.40 vs M = 1.93, adjusted p = .029). For those who were high in identification with the SSC, these effects were reversed and the Self-ASC condition led to significantly lower smoking cessation self-efficacy (M= 1.85 vs M = 2.34, adjusted p = .039). Figure

10 graphically presents the predicted least square means of smoking cessation self-efficacy by level of identification with the SSC.

Figure 10. Predicted least square means of smoking cessation self-efficacy by identification with the SSC

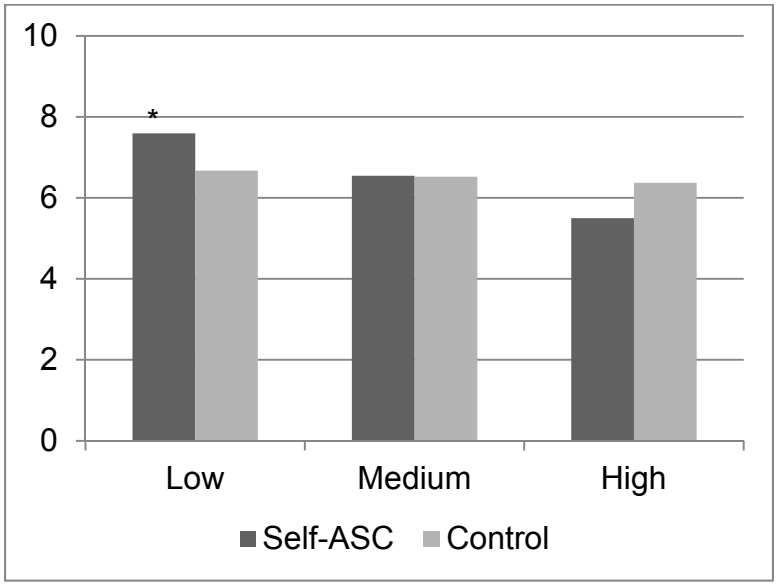


Note. For all comparisons, *df* = 1197. *$p < .05$ compared to the *Control* condition by Dunnett's test.

Smoking cessation attitudes. A similar effect was found for smoking cessation attitudes. Post-hoc analysis with Dunnett's contrasts showed that for those who were low in identification with the SSC, the Self-ASC condition led to significantly higher smoking cessation attitudes (M= 7.59 vs M = 6.67, adjusted p = .040) compared to the Control condition. However, for those who were strongly identified with the SSC, the Self-ASC condition led to lower attitudes, though

these effects were only marginally significant (M= 5.50 vs M = 6.37, adjusted p = .085). Figure 11 graphically presents the predicted least square means of smoking cessation attitudes by level of identification with the SSC.

Figure 11. Predicted least square means of smoking cessation attitudes by identification with the SSC



Note. For all comparisons, *df* = 1197. *$p < .05$ compared to the *Control* condition by Dunnett's test.

Discussion

Determinants of smoking cessation

Neither message frames nor message value content have any significant main effects on the determinants of smoking cessation measured in this study. There are no interaction effects observed between the ASC message frames and

the self-direction content on the outcomes. Thus, this study does not provide any evidence that the messages changed the determinants of smoking cessation from those of a no-message control group.

Several explanations can be offered for the lack of effects on the determinants of smoking cessation observed in this study. Given the relatively small effect sizes typically found in smoking related health communication campaigns (Snyder et al., 2004), the sample size in this study may not have been large enough to detect the effects even though this study had relatively high power to detect such effects if they existed. In addition, given that smoking is a relatively difficult behavior to change, the impact of a single exposure to a smoking cessation message may be small and thus difficult to capture in the types of measures used in this study. Priming effects are enhanced by the frequency and duration of exposure to the prime (Roskos-Ewoldsen et al., 2013). This study used a single exposure that was relatively brief (60 seconds), and thus priming effects may have been too weak to detect in this study. Additionally, the specific messages used in this study may have contained arguments that were weak, and thus not persuasive.

As well, because this study only included measures of determinants of behavior change, and did not measure actual smoking cessation attempts, the messages may have had a long term effect on smoking behavior not captured in this study. As well, as evidenced by the moderating effects of the SSC, it may be

that the messages affect viewers differently based on individual difference variables.

Persuasion effects

The message frames have no significant main effects on mean levels of identification with the ASC. This result lends further support that identification with the ASC is not impacted by smoking self-concept message frames, even when these frames are combined with content related to prioritized values. Though the effects of countless possible alternative message frames and content remain to be evaluated, the type of messages used in this study do not show promise for persuading viewers to increase their identification with the ASC. Further research and theory could help shed light on alternative message approaches that may impact this self-concept.

However, the ASC frame combined with self-direction content reduces identification with the SSC as compared to the *Control* condition. These results validate the findings from study 2, and provide further evidence that ASC frame messages motivate viewers to reflect on their current identities as smokers. Imagining themselves as former smokers leads participants to distance themselves from their current identity as a smoker. Thus, messages with ASC frames may be an effective route through which to reduce participants' identification with the SSC.

Priming Effects

This study suggests that the ASC frame messages prime the SSC when these frames are combined with a high-priority value of self-direction. The strengths of association between the SSC and smoking cessation intentions, smoking cessation self-efficacy, and smoking cessation attitudes are all significantly decreased in the *Self-ASC* condition as compared to the *Control* condition. These associations, which are small and non-significant in the *Control* condition, become significantly negative in the Self-ASC condition. Thus, identification with the SSC has a more negative relationship with smoking cessation intentions, smoking cessation self-efficacy, and smoking cessation attitudes in the *Self-ASC* condition as compared to the no-message *Control* condition.

This result suggests that the *Self-ASC* message has a positive influence on the determinants of smoking cessation only if the viewer does not incorporate the SSC strongly into their self-definition. When the viewer of the message identifies strongly with the SSC, the message has a boomerang effect of reducing determinants that drive smoking cessation behaviors. This result suggests that smoking-related self-concepts play an important role in the persuasive effects of anti-smoking messages such that those who weakly identify with the SSC are most persuaded to change their behavior by anti-smoking

messages, while those who strongly identify with the SSC are inoculated against these persuasive attempts.

As a consequence of priming effects of the *Self-ASC* condition, the SSC moderates the effects of the *Self-ASC* message on the determinants of smoking cessation. These effects are in-line with previous priming studies. Priming outcomes are thought to affect beliefs and attitudes that are already stored in memory. The priming effects on the determinants of smoking cessation are most pronounced among smokers with at least moderate identification with the SSC. Thus, for respondents who do not identify with the SSC, viewing the Self-ASC message increases their smoking cessation intentions, self-efficacy, and attitudes. On the other hand, for respondents who strongly identify with the SSC, viewing the *Self-ASC* condition message decreases their smoking cessation intentions, self-efficacy, and attitudes.

Unexpectedly, the studies in this research failed to find evidence that identification with the ASC influences the persuasiveness of anti-smoking messages. This result suggests that current identity variables such as the SSC are better predictors of message effects than future oriented identities.

Chapter 8: GENERAL CONCLUSIONS

In general, anti-smoking campaigns have been successful. Smoking rates in the United States have declined dramatically and continue to drop. However, there remain a few smokers who are hard to reach and resistant to behavior change. This research adds to the literature by providing an understanding of how messages that incorporate smoking-related self-concept frames and appeals to personal values impact determinants of smoking cessation.

The studies explored the identity related aspects of smoking and the value priorities of smokers. The studies then attempted to develop smoking cessation messages that reach smokers by focusing on the smoking-related self-concepts and by capitalizing on the motivational nature of values as message content. The studies describe the ways messages impact the determinants of smoking cessation as a function of individuals' identification with the smoking-related self-concepts. The studies show that individual differences in identification with the smoking-related self-concepts regulate smoking behavior, smoking cessation behaviors, and responses to smoking cessation messages.

This research highlights the potential of the smoking-related self-concepts as psychological individual difference constructs that are target areas for developers of anti-smoking messages and interventions, and the implications of identification with these self-concepts on message design and evaluation.

Summary of studies

To understand effect of messages on the likelihood of engaging smoking cessation behaviors, five studies were presented. The first study measured the extent to which identification with current identities as a smoker (SSC) and future identities as an abstainer (ASC) operates in intentions and self-efficacy related to smoking cessation. The first study confirmed a relationship between variation in identification with the ASC and smoking cessation intentions and self-efficacy. As individuals increasingly identify with the ASC, they are more likely to intend to quit smoking and to feel confident in their ability to do so. However, the first study failed to find evidence of a relationship between identification with the SSC and smoking cessation intentions and self-efficacy.

The second study determined whether using smoking-related self-concept frames in smoking cessation messages impacted identification with the ASC and SSC through persuasion and priming effects. The second study did not find any evidence that ASC or SSC frame messages manipulate the mean level of identification with the ASC. However, the results suggest that messages with an ASC frame may reduce the mean level of identification with the SSC, though this reduction did not reach statistical significance. In addition, the second study confirms that ASC frame messages prime the ASC, but not the SSC. On the other hand, there is no evidence that SSC frame messages prime either smoking-related self-concept.

The third study assessed smokers' value priorities, and evaluated whether identification with the smoking-related self-concepts impacts the rank order of the values. The third study found that for smokers, self-direction is the most important value; benevolence and universalism are second in priority; hedonism is third; security is fourth; achievement, conformity, stimulation are fifth; tradition is sixth; and power is the least prioritized value. The third study did not find any evidence that differences in identification with the smoking-related self-concepts lead to differences in the rank order of the values.

The fourth and fifth study assessed participants' evaluations of messages that combined smoking-related self-concept frames with values. The fourth study evaluated messages with all possible values, and the fifth study focused only on the highest and lowest priority values identified in study 3 (i.e. self-direction and power). Though the messages evaluated in the fourth study was not successful at expressing their target values, the fifth study confirmed that the self-direction messages are expressive of self-direction values, and that the power messages are expressive of power values. The fifth study also confirmed that self-direction messages are more relevant to participants than power messages, but found no evidence that the messages varied in their quality. The fifth study did not find any evidence that ASC frame messages produce less reactance in smokers as compared to SSC frame messages.

The final study examined the persuasive and priming effects of message manipulations that combined smoking-related self-concept frames with high and low priority values, and evaluated the effects of these messages on the determinants of smoking cessation. The study did not find any evidence of main effects of the smoking-related self-concept frames, nor of the value priorities, nor of their combination. Mirroring the results from the second study, the high priority value (i.e. self-direction) message when combined with the ASC frame reduced identification with the SSC. However, contrary to the findings of the second study, the self-direction ASC frame message primed the SSC rather than the ASC.

Post-hoc tests of the moderating effect of identification with the SSC on the effect of messages on the outcomes showed that messages with self-direction content and an ASC frame increased smoking cessation intentions, self-efficacy, and attitudes for those who were low in their identification with the SSC, but reduced these determinants in those who were high in their identification with the SSC.

Smoking-related self-concepts

Though some smokers do not identify with either self-concept, most smokers agree that they identify with the SSC, the ASC, or with both self-concepts. Looking across the four samples, about one-third of smokers identify

with the ASC but not with the SSC (*M* = 29.7%, *SD* = 3.0%). The next two largest groups are those who identify with both the ASC and SSC (*M* = 20.7%, *SD* = 5.0%), and those who identify with the SSC but not with the ASC (*M* = 19.5%, *SD* = 8.9%). Less than one-tenth of smokers (*M* = 7.4%, *SD* = 1.6%) do not identify with either smoking-related self-concept. These results suggest that smoking-related self-concepts are incorporated into most smokers' identities at least to some degree. For the majority of smokers, the smoking-related self-concepts are part of their self-definition.

The two smoking-related self-concepts have an inverse relationship. Across the studies, there is a consistently significant negative relationship between the ASC and the SSC ranging in strength from *r* = -.19 to *r* = -.44. As smokers increasingly identify with one of the smoking-related self-concepts, their identification with the other smoking-related self-concept decreases. Individuals who identify strongly with the ASC identify weakly with the SSC, and individuals who identify strongly with the SSC identify weakly with the ASC.

However, identification with one of these self-concepts does not alone explain variation in identification with the other self-concept. The studies show that the percent of the variation in one of the smoking-related self-concepts that is explained by variation in the other smoking-related self-concept is between 3.6% and 19.4%. These coefficients of determination suggest that other variables influence identification with the ASC and SSC. Though these self-concepts are

related to each other, they represent distinct self-concepts with unique predictors and functions.

In addition, the smoking-related self-concepts have expected associations with other smoking-related characteristics. However, these characteristics also do not fully explain differences in identification with the SSC and ASC. Correlation analyses in each of the studies shows that smoking-related self-concepts have a weak to moderate association with other smoking-related characteristics. As individuals identify more strongly with the ASC, they are less dependent on nicotine (FTND, range: r = -.02 to r = -.34), are further along the contemplation ladder to smoking cessation (CL, range: r = .36 to r = .50), have tried to quit more times (range: r = .12 to r = .20), and started smoking later in life (range: r = -.07 to r = -.31). As individuals increasingly identity with the SSC, they are more dependent on nicotine (FTND, range: r = .17 to r = .28), at lower stages of change along on the contemplation ladder to smoking cessation (CL, range: r = -.07 to r = -.31), and have started smoking earlier in life (range: r = -.03 to r = -.10).

Thus, identification with the SSC or ASC can be partially inferred from other smoking-related characteristics and behaviors such as nicotine dependence or age at smoking initiation. However, identification with the smoking-related self-concepts reflects more than just the smoking-related characteristics. For example, identification with the ASC is influenced by factors

other than the number of times one has attempted to quit smoking in the past and the degree to which one is thinking about quitting smoking. Though these characteristics contribute to the ASC, they are not the only factors that explain this self-concept.

Identification with the ASC partially explains differences in the determinants of smoking cessation. The more smokers identify with the ASC, the more they intend to change their smoking behavior and the more they believe they are able to do so. Correlation analyses in the four samples show that smokers who identify with the ASC have higher smoking cessation self-efficacy (range: $r = .33$ to $r = .51$), intentions (range: $r = .38$ to $r = .58$), and attitudes ($r = .57$). The ASC has a unique contribution to these outcomes above and beyond other smoking-related characteristics that have been previously identified in the literature as important predictors of smoking cessation outcomes. Regression analysis across the four samples consistently demonstrates that the ASC is significantly related to smoking cessation self-efficacy (range: $B = .16$, $p < .001$, to $B = .40$, $p < .001$) and intentions (range: $B = .11$, $p < .05$, to $B = .27$, $p < .001$) above and beyond other smoking-related characteristics such as addiction to nicotine or years of smoking, demographic characteristics such as age, and identification with the SSC.

This study demonstrates that the SSC is not as clearly related to the determinants of smoking cessation as had been proposed in the literature.

Theories of self and identity suggest that it should be possible to predict differences the determinants smoking cessation from one's level of identification with the SSC. However, this research does not find consistent evidence to support this prediction. In all the studies, the SSC has a negative correlation with smoking cessation self-efficacy (range: r = -.03 to r = -.22) and intentions (range: r = .00 to r = -.18). However, these correlations are small relative to those between the ASC and these outcomes. Out of four samples, these correlations are significant in two for smoking cessation intentions, and in three for self-efficacy.

Regression analyses do not find consistent evidence of a relationship between the SSC and the determinants of smoking cessation. Even though the correlation analyses suggest that the SSC has a negative relationship with the determinants of smoking cessation, once other smoking-related characteristics, demographic characteristics, and identification with the ASC are included in the regression models, the SSC has a positive relationship with smoking cessation self-efficacy in the final study (B = .09, p < .001) and a positive relationship with smoking cessation intentions in the first (B = .08, p < .001) and final (B = .03, p < .05) studies. These relationships are not significant in the other studies. So that while the correlational analysis finds weak negative relationships between the SSC and the determinants of smoking cessation, the regression analyses that control for the role of the ASC as well as other smoking related characteristics

find no relationship, or a slight positive relationship. These results illustrate the SSC, while related to smoking behaviors and to the ASC, does not have a clear relationship with either smoking cessation self-efficacy or intentions.

Thus, the ASC plays a significantly more important role in the determinants of smoking cessation than the SSC. Though these findings are cross-sectional, they support the motivational nature of identification with future self-concepts that has been suggested in the literature. Smokers who identify with a mental representation of the self as a non-smoker (i.e. ASC) are more motivated to quit smoking and to feel confident in their ability to act upon those desires. However, identification with current self-concepts does not impact behaviors that would change that self-concept. The SSC findings confirm the lack of evidence on the role of the SSC in smoking cessation outcomes in previous experimental studies (Shadel & Mermelstein, 1996). Thought the SSC is related to smoking behaviors, current views of the self as a smoker do not appear to dissuade smokers from engaging in smoking cessation behaviors, and if anything, may have a slight positive effect on these outcomes.

Smokers' values priorities

Smokers share a common value priority structure that differs somewhat from the rank order of values observed in a general population (Schwartz, 1994, 2004). All smokers prioritize freedom and independence (self-direction value)

above the welfare of others (benevolence and universalism values). Smokers report that their least important value is power, a value related to seeking social approval and the attainment or preservation of a dominant position within the more general social system. The priority placed on different values is not influenced by identification with the smoking-related self-concepts.

Message effects

The studies provide some initial evidence that messages with ASC frames persuade individuals to reduce their identifications with the SSC. Regardless of the values expressed, identification with the SSC is lower after participants view ASC frame messages. These results suggest that messages emphasizing the ASC identity bring to mind the SSC.

These outcomes support the predictions of self-concept theory that future oriented self-concepts serve as criteria against which to assess the current self (Markus & Nurius, 1986). ASC frame messages offer an evaluative context for the current view of the self as a smoker. Because these messages communicate new and inconsistent information about the self (i.e. “I value self-direction, becoming a non-smoker will give me more self-direction, but I am currently a smoker.”), they provide additional meaning to the current self as a smoker and challenge the value participants place on their SSC identity. In this context, viewers may experience negative affect regarding their current identity as a

smoker in the form of shame or embarrassment, leading the viewer to distance themselves from this aspect of their self-concept. Thus, in the context of ASC frames, identification with the SSC is reduced.

The studies also provide evidence that messages with ASC frames prime the smoking-related self-concepts. Messages that illustrate how the ASC is consistent with all possible values enhance the motivational aspects of the ASC, making the ASC a stronger predictor of smoking cessation intentions and self-efficacy. On the other hand, viewing a single message emphasizing how the ASC is consistent with the most prioritized value of self-direction activates the current identity as a smoker. Though the SSC is usually not considered when participants form smoking cessation intentions and self-efficacy, when exposed to a self-direction expressive message with an ASC frame, the SSC becomes a salient and thus significant negative predictor of these outcomes.

These results suggest that messages that target the ASC can inadvertently activate the SSC, particularly when the message is relevant to participants. By bringing the SSC to mind, self-direction expressive messages with ASC frames lead to unintended effects of priming the negative relationship between the SSC and the determinants of smoking cessation. Even when the SSC is not explicitly targeted by the message, the SSC can become influential in directing how information about the self is processed.

The ASC frame messages with self-direction content are persuasive when identification with the SSC is low, but create resistance to changes in smoking behavior when identification with the SSC is high. For those who do not identify with the SSC, self-direction expressive messages with ASC frames lead viewers to question and to be more open to changing their smoking behaviors, thereby increasing the determinants of smoking cessation. However, for those who identify strongly with this self-concept and thus for whom smoking is important for their self-definition, this type of message reduces smoking cessation intentions and self-efficacy.

These outcomes show that the SSC influences the persuasiveness of some types of anti-smoking messages. These results support theory on the role of self-concepts in determining the way information is processed (Markus & Nurius, 1986) and are consistent with the predictions of priming theory (Roskos-Ewoldsen et al., 2013). Because the messages prime the negative relationship between the SSC and the determinants of smoking cessation, the negative influence of the priming effect is observed for those who hold at least some level of identification with that self-concept. The more strongly participants identify with the SSC the more negative the impact of the message on their smoking cessation intentions, self-efficacy, and attitudes.

Smokers for whom the SSC is an important part of their self-concept may be particularly sensitive to information that provides new and inconsistent

information about the SSC. These types of messages may undermine smokers' sense of self-integrity and paradoxically encourage smokers to develop arguments in favor of their habit. When the SSC is brought to mind, viewers who identify with the SSC strongly may react defensively by reaffirming their justifications for continued smoking, thereby reducing their smoking cessation intentions and self-efficacy.

However, reviewing ones value priorities seems to protect participants against this priming effect. When participants review the PVQ prior to viewing the ASC frame message, the SSC is not primed. Instead, following a PVQ task, the ASC frame messages bring to mind the ASC rather than the SSC. Though these outcomes support the predictions of affirmation theory, further research is needed to understand the mechanisms behind these protective effects.

There is no evidence in any of the studies that SSC frames prime the smoking-related self-concepts, or persuade individuals to change their identification with these self-concepts. Messages with a SSC frame do not impact the relationship between identification with the ASC or the SSC and the determinants of smoking cessation. These outcomes validate findings from prior research that anti-smoking messages do not impact identification with the SSC (Falomir & Invernizzi, 1999). The lack of priming effects of the SSC frames may result because these frames are more similar to the types of smoking cessation messages commonly found in the media, and thus these messages are less

novel. Viewers may not be motivated to elaborate these messages at the same level of processing as they do the more novel ASC frame messages.

Limitations

This study is limited by the fact that the survey data used to evaluate the association between the smoking-related self-concepts and the determinants of smoking cessation are correlational in nature and therefor do not indicate the sequence of events. Even though the results suggest that there is a relationship between the smoking-related self-concepts and smoking cessation determinants, the basis for this relationship is not defined in this study. It is equally likely that identification with the smoking-related self-concepts influences the determinants of smoking cessation, or that the determinants of smoking cessation influence identification with the smoking-related self-concepts. For example, as an individual increasingly intends to quit smoking, their identification with the ASC may increase.

It is also possible that a third confounding variable may explain the observed relationship between the smoking-related self-concepts and the determinants of smoking cessation. Even though the analysis was conducted with adjustments for potential known confounders, and the relationship remained after adjustment for these factors, it may be that a third unmeasured variable explains the relationships between identification with the ASC and the

determinants of smoking cessation. Thus, it is impossible to infer causality and the observed associations must be interpreted with caution.

Another limitation of this study is that it used a non-probability convenience sample of smokers from online panels. This type of sampling frame is prone to selection bias. It may be that individuals who selected to participate in this study are different from smokers in general. It is possible that the observed outcomes are influenced by the types of participants in this particular study. As well, there is no way to know whether non-responders differed from the participants in this study. Thus, the results may not generalize to other populations of smokers.

In addition, the messages in this study were web-based manipulations, and thus are not necessarily ecologically valid. The findings would have more external validity if this study was conducted in the real-world using actual encounters of individuals with anti-smoking messages in their everyday life. Because self-concepts are thought to regulate behavior within specific social contexts, the effects of the messages may have been different in different situations. As well, priming effects may be different in realistic settings.

Identification with the smoking-related self-concepts was measured at one point in time, combining smokers at different stages of smoking and smoking cessation behavior. It would be useful to establish the differential contribution of

these dynamic identity variables across the early and late stages of becoming a smoker, and of engaging in smoking cessation behaviors. For example, social factors have been shown to play a bigger role in the early versus late stages of smoking behavior (Conrad, Flay, & Hill, 1992). It may be that identification with the SSC contributes more to smoking cessation behaviors in the early stages of smoking initiation. On the other hand, the ASC may play a bigger role in motivating smoking cessation behaviors in later stages of smoking, when individuals have more experiences engaging in smoking cessation attempts. Alternatively, failed smoking cessation attempts may strengthen the SSC by reinforcing an individual's image of themselves as a smoker.

Since the participants in this study were all adults ages 18 and over, and identification with the smoking-related self-concepts was measured at a single point in time, it was not possible to explore these effects. However, it may be that the weak of non-existent relationship between the SSC and the determinants of smoking cessation is due to the stage of smoking of the participants in this study. Further studies are needed to explore the dynamic relationship between identification with the smoking-related self-concepts and smoking cessation behaviors throughout the stages of smoking initiation and smoking cessation behaviors, and among participants of various age groups.

The present study looked at determinants of smoking cessation behavior as a proxy for actual attempts to quit smoking. One possible explanation for the

lack of main effects of the messages may be that the determinants of smoking cessation behavior are influenced in a non-significant way by the messages in these studies, but that taken together the influence on actual smoking cessation behaviors is positive. Further research is needed to explore these potential long-term effects and shed light on whether identity and value based messages affect these behaviors.

Directions for future research

Despite the literature on self-concepts, communication scholars have rarely integrated this work into their research. This dissertation is a first step in addressing this deficit. The studies in this research show that the ways individuals define themselves impacts their behavior and the way they interpret messages that attempt to influence our behavior. The results of this research have both theoretical and practical implications.

In terms of theory, the results of the studies presented here contribute to a better understanding the processes underlying smoking cessation, and suggest that theories of behavioral prediction may be enhanced by taking self-concepts into account. Many contemporary behavior change theories focus on beliefs, attitudes, and norms as antecedents to behavioral intentions and behavior change (e.g. TRA/TPB, Fishbein & Ajzen, 2010; HBM, Rosenstock, 1960). This

research suggests that self-concepts may be important additional considerations in understanding behavior and behavior change outcomes.

The findings of this research also imply practical conclusions. The outcomes suggest ways that antismoking messages can be made more effective at promoting smoking cessation behaviors. Smoking cessation messages may have a greater impact if they take into account the smoking-related self-concepts by focusing on the target audiences' level of identification with these self-concepts and to being sensitive to these individual differences. For example, the studies show that messages have the potential to inadvertently prime the SSC. Thus, the implications of smokers' identification with the SSC on message outcomes should be considered when designing and developing messages.

The ASC outcomes confirm that this construct is a potential target area for smoking cessation messages aiming to impact the determinants of smoking cessation. These outcomes suggest that interventions and messages which attempt to directly increase identification with the ASC may be beneficial at increasing smoking cessation attempts. Given the strong relationship between the ASC and determinants of smoking cessation, developing messages that could target this construct is important. It would also be useful in future studies to compare these types of messages to more typical anti-smoking appeals that tend to focus on the health-related risks of smoking (Beaudoin, 2002; Cohen, Shumate, & Gold, 2007).

Though the ASC frame messages with self-direction content only increased the determinants of smoking cessation for those who did not already identify with the SSC, these types of messages may have utility for promoting smoking cessation. Across the samples in this research, about 40% of respondents did not identify with the SSC. Thus, the potential reach of such an intervention is broad. As well, these types of messages may be beneficial for particular types of audiences. One group where SSC identification may be low is adolescences who are at early stages of smoking (Chassin, Presson, & Sherman, 1990). Studies have shown that individuals in this group only weakly identity as smokers (Conrad et al., 1992).

However, the results suggest that focusing on the identity aspects of smoking alone is probably not sufficient to change smoking cessation behaviors. Further research is needed to determine if combinations of multiple variables related to smoking, such as nicotine dependence, could improve the effects of interventions targeting respondent's smoking-related self-concepts. This study is limited in that it evaluated the effects of four messages that incorporated a particular message frame and value content. Further research could determine if alternative interventions can be designed to more specifically target the smoking-related self-concepts and change them directly.

APPENDIX A: Study 1 Survey Items

Eligibility

How old are you? (Please type in your answer)	[*number box, range 0-99*]

[If AGE <18 terminate survey]

Have you smoked at least 100 cigarettes in your entire life?	Yes No

[If = No terminate survey]

Do you now smoke cigarettes every day, some days, or not at all?	Every day Some days Not at all

[*If ≠ Every Day terminate survey*]

Smoking-related Characteristics

Smoking Initiation Age

How old were you when you smoked your first whole cigarette? (Please type in your answer)	[*number box, range 0-99*]

Nicotine dependence: Fagerström Test

In the past 7 days, how many cigarettes did you smoke on a TYPICAL DAY? (Please type in your answer)	[*number box, range 0-99*]
How soon after you wake up do you smoke your FIRST cigarette?	Less than 5 minutes 6 to 30 minutes 31 to 60 minutes More than 60 minutes
Do you find it difficult to refrain from smoking in places where it is forbidden, such as in church, at the library, or at the movies?	Yes No
Which cigarette would you hate most to give up?	First one in the morning All others
Do you smoke more cigarettes during the first hours after waking up than during the rest of the day?	Yes No
Do you smoke if you are so ill that you are in bed most of the day?	Yes No

Quit Attempts

In the past 12 months, how many times have you stopped smoking for one day or longer because you were trying to quit smoking? (Please type in your answer)	[*number box, range 0-99*]

Contemplation Ladder

Choose the number that describes where you are now in thinking about quitting smoking:	10 I am taking action to quit smoking 9 8 I am starting to think about how to reduce the number of cigarettes I smoke a day 7 6 5 I think I should quit smoking but I am not quite ready 4 3 2 I think I need to consider quitting someday 1 0 I have no thoughts about quitting smoking

Smoking-related Self-Concepts

Please tell us how much you agree or disagree with the following statements.

Smoker self-concept

[Random order of items in Table below]

Smoking is part of my self-image.	Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree
Smoking is part of who I am.	
Smoking is part of my personality.	

Abstainer self-concept

[Random order of items in Table below]

I am able to see myself as a non-smoker.	Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree
It is easy to imagine myself as a non-smoker.	
I am comfortable with the idea of being a non-smoker.	

Determinants of Smoking Cessation

Cessation Intentions

In the next 30 days, how likely is it that you will do each of the following?

Try to quit smoking.	Definitely will not Probably will not Probably will Definitely will
Reduce the number of cigarettes I smoke in a day.	
Call a quitline.	

Cessation Self-Efficacy

In the next 30 days, how sure are you that you could do the following things if you wanted to?

Quit smoking completely.	Not at all sure A little sure Somewhat sure Very sure
Avoid smoking when I am craving a cigarette.	
Avoid smoking when I am around friends who are smoking.	

Demographic Questions

Education

What is the highest level of school you completed or the highest degree you received?	Never attended school Elementary or grade school Some high school High school graduate or GED Some college College graduate Postgraduate/masters/doctorate/law/MD

Ethnicity

Are you Hispanic, Latino/a, or Spanish origin? (One or more categories may be selected)	Yes No

Race

What is your race? (One or more categories may be selected)	White Black or African American American Indian or Alaska Native Asian Indian Chinese Filipino Japanese Korean Vietnamese Other Asian Native Hawaiian Guamanian or Chamorro Samoan

Income

What was your annual household income from	Less than $25,000

all sources in 2011? Was it…?	Between $25,000 and $49,999 Between $50,000 and $74,999 Between $75,000 and $99,999 Between $100,000 and $149,999 $150,000 or more

APPENDIX B: Study 2, 3, & 4 Survey Items

Eligibility

How old are you? (Please type in your answer)	[*number box, range 0-99*]

[If AGE <18 terminate survey]

Are you male or female?	Male Female

Have you ever done any of the following?

[Random order of items]

Gotten a vaccine against the flu, also known as flu shot or the influenza vaccine?	Yes No Not sure
Been screened to see if you have cancer or a malignancy of any kind?	
Been tested to see if you have Hepatitis C?	
Have you smoked at least 100 cigarettes in your entire life?	

[If SMK_EVER ≠ "Yes" terminate survey]

In the past 30 days, have you smoked cigarettes every day, some days, or not at all?	Every day Some days

	Not at all

[If SMK_NOW ≠ “Every Day” terminate survey]

Thank you, you qualify for this study! Please tell us how much you agree or disagree with the following statements.

Smoking-related Self-Concepts

Please tell us how much you agree or disagree with the following statements.

Smoker self-concept

[Random order of items in Table below]

Smoking is part of my self-image.	Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree
Smoking is part of who I am.	
Smoking is part of my personality.	

Abstainer self-concept

[Random order of items in Table below]

I am able to see myself as a non-smoker.	Strongly disagree Disagree Neither agree nor disagree
It is easy to imagine myself as a non-smoker.	
I am comfortable with the idea of being a non-	

smoker.	Agree Strongly agree

Smoking-related Characteristics

Smoking Initiation Age

How old were you when you smoked your first whole cigarette? (Please type in your answer)	[*number box, range 0-99*]

Nicotine dependence: Fagerström Test

In the past 7 days, how many cigarettes did you smoke on a TYPICAL DAY? (Please type in your answer)	[*number box, range 0-99*]
How soon after you wake up do you smoke your FIRST cigarette?	Less than 5 minutes 6 to 30 minutes 31 to 60 minutes More than 60 minutes
Do you find it difficult to refrain from smoking in places where it is forbidden, such as in church, at the library, or at the movies?	Yes No
Which cigarette would you hate most to give up?	First one in the morning

	All others
Do you smoke more cigarettes during the first hours after waking up than during the rest of the day?	Yes No
Do you smoke if you are so ill that you are in bed most of the day?	Yes No

Quit Attempts

In the past 12 months, how many times have you stopped smoking for one day or longer because you were trying to quit smoking? (Please type in your answer)	[*number box, range 0-99*]

Contemplation Ladder

Choose the number that describes where you are now in thinking about quitting smoking:	10 I am taking action to quit smoking 9 8 I am starting to think about how to reduce the number of cigarettes I smoke a day 7 6 5 I think I should quit smoking but I am not quite ready 4

	3 2 I think I need to consider quitting someday 1 0 I have no thoughts about quitting smoking

Determinants of Smoking Cessation

Cessation Intentions

In the next 30 days, how likely is it that you will do each of the following?

Try to quit smoking.	Definitely will not Probably will not Probably will Definitely will
Reduce the number of cigarettes I smoke in a day.	
Call a quitline.	

Cessation Self-Efficacy

In the next 30 days, how sure are you that you could do the following things if you wanted to?

Quit smoking completely.	Not at all sure A little sure Somewhat sure Very sure
Avoid smoking when I am craving a cigarette.	
Avoid smoking when I am around friends who are smoking.	

Demographic Questions

Education

What is the highest level of school you completed or the highest degree you received?	Never attended school Elementary or grade school Some high school High school graduate or GED Some college College graduate Postgraduate/masters/doctorate/law/MD

Ethnicity

Are you Hispanic, Latino/a, or Spanish origin? (One or more categories may be selected)	Yes No

Race

What is your race? (One or more categories may be selected)	White Black or African American American Indian or Alaska Native Asian Indian

	Chinese Filipino Japanese Korean Vietnamese Other Asian Native Hawaiian Guamanian or Chamorro Samoan

Income

What was your annual household income from all sources in 2011? Was it…?	Less than $25,000 Between $25,000 and $49,999 Between $50,000 and $74,999 Between $75,000 and $99,999 Between $100,000 and $149,999 $150,000 or more

Schwartz's Portrait Value Questionnaire

Instructions:

Now you will see descriptions of different people. Please read each description and tell us how much each person is or is not like you.

Response options:

Very much like me

Like me

Somewhat like me

A little like me

Not like me

Not at all like me

Values and Corresponding Items & Item Numbers:

Benevolence

12. It is very important to (him/her) to help the people around (him/her). (He/She) wants to care for other people.

18. It is important to (him/her) to be loyal to his friends. (He/She) wants to devote (herself/herself) to people close to (him/her).

27. It is important to (him/her) to respond to the needs of others. (He/She) tries to support those (he/she) knows.

33. Forgiving people who might have wronged (him/her) is important to (him/her). (He/She) tries to see what is good in them and not to hold a grudge.

Universalism

3. (He/She) thinks it is important that every person in the world be treated equally. (He/She) wants justice for everybody, even for people (he/she) doesn't know.

8. It is important to (him/her) to listen to people who are different from (him/her). Even when (he/she) disagrees with them, (he/she) still wants to understand them.

19. (He/She) strongly believes that people should care for nature. Looking after the environment is important to (him/her).

23. (He/She) believes all the worlds' people should live in harmony. Promoting peace among all groups in the world is important to (him/her).

29. (He/She) wants everyone to be treated justly, even people (he/she) doesn't know. It is important to (him/her) to protect the weak in society.

40. It is important to (him/her) to adapt to nature and to fit into it. (He/She) believes that people should not change nature.

Self-direction

1. Thinking up new ideas and being creative is important to (him/her). (He/She) likes to do things in his own original way.

11. It is important to (him/her) to make his own decisions about what (he/she) does. (He/She) likes to be free to plan and to choose his activities for (herself/herself).

22. (He/She) thinks it's important to be interested in things. (He/She) likes to be curious and to try to understand all sorts of things.

34. It is important to (him/her) to be independent. (He/She) likes to rely on (herself/herself).

Stimulation

6. (He/She) thinks it is important to do lots of different things in life. (He/She) always looks for new things to try.

15. (He/She) likes to take risks. (He/She) is always looking for adventures.

30. (He/She) likes surprises. It is important to (him/her) to have an exciting life.

Hedonism

10. (He/She) seeks every chance (he/she) can to have fun. It is important to (him/her) to do things that give (him/her) pleasure.

26. Enjoying life's pleasures is important to (him/her). (He/She) likes to 'spoil' (herself/herself).

37. (He/She) really wants to enjoy life. Having a good time is very important to (him/her).

Achievement

4. It is very important to (him/her) to show his abilities. (He/She) wants people to admire what (he/she) does.

13. Being very successful is important to (him/her). (He/She) likes to impress other people.

24. (He/She) thinks it is important to be ambitious. (He/She) wants to show how capable (he/she) is.

32. Getting ahead in life is important to (him/her). (He/She) strives to do better than others.

Power

2. It is important to (him/her) to be rich. (He/She) wants to have a lot of money and expensive things.

17. It is important to (him/her) to be in charge and tell others what to do. (He/She) wants people to do what (he/she) says.

39. (He/She) always wants to be the one who makes the decisions. (He/She) likes to be the leader.

Security

5. It is important to (him/her) to live in secure surroundings. (He/She) avoids anything that might endanger his safety.

14. It is very important to (him/her) that his country be safe from threats from within and without. (He/She) is concerned that social order be protected.

21. It is important to (him/her) that things be organized and clean. (He/She) doesn't want things to be a mess.

31. (He/She) tries hard to avoid getting sick. Staying healthy is very important to (him/her).

35. Having a stable government is important to (him/her). (He/She) is concerned that the social order be protected.

Conformity

7. (He/She) believes that people should do what they're told. (He/She) thinks people should follow rules at all times, even when no-one is watching.

16. It is important to (him/her) always to behave properly. (He/She) wants to avoid doing anything people would say is wrong.

28. It is important to (him/her) to be obedient. (He/She) believes (he/she) should always show respect to his parents and to older people.

36. It is important to (him/her) to be polite to other people all the time. (He/She) tries never to disturb or irritate others.

Tradition

9. (He/She) thinks its important not to ask for more than what you have. (He/She) believes that people should be satisfied with what they have.

20. Religious belief is important to (him/her). (He/She) tries hard to do what his religion requires.

25. (He/She) believes it is best to do things in traditional ways. It is important to (him/her) to follow the customs (he/she) has learned.

38. It is important to (him/her) to be humble and modest. (He/She) tries not to draw attention to (herself/herself).

Message Matching Task

Instructions:

We need your help to create messages about what people say they value in life. [ASC Frame Condition:] In the next section are statements that people said are the positive results of becoming a non-smoker. You will also see two value categories and their definitions.

[SSC Frame Condition:] In the next section are statements that people said are the negative results of being a smoker. You will also see two value categories and their definitions.

Read each statement and think about what the person who said it values most. Choose the best category for each statement.

APPENDIX C: Study 5 Survey Items

Eligibility

How old are you? (Please type in your answer)	[*number box, range 0-99*]

[If AGE <18 terminate survey]

Have you ever done any of the following?

[Random order of items]

Bought organic products?	Yes
Drank more than five alcoholic beverages in one night?	No
Been to a tanning salon?	Not
Have you smoked at least 100 cigarettes in your entire life?	sure

[If ≠ "Yes" terminate survey]

In the past 30 days, have you smoked cigarettes every day, some days, or not at all?	Every day Some days Not at all

[*If ≠ "Every Day" terminate survey]*

Thank you, you qualify for this study! Please tell us how much you agree or disagree with the following statements.

Do you now smoke cigarettes every day, some days, or not at all?	Every day Some days Not at all

[*If ≠ Every Day terminate survey*]

Smoking-related Self-Concepts

Please tell us how much you agree or disagree with the following statements.

Smoker self-concept

[Random order of items in Table below]

Smoking is part of my self-image.	Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree
Smoking is part of who I am.	
Smoking is part of my personality.	

Abstainer self-concept

[Random order of items in Table below]

I am able to see myself as a non-smoker.	Strongly disagree Disagree Neither agree nor disagree
It is easy to imagine myself as a non-smoker.	
I am comfortable with the idea of being a non-	

smoker.	Agree Strongly agree

Smoking-related Characteristics

Smoking Initiation Age

How old were you when you smoked your first whole cigarette? (Please type in your answer)	[*number box, range 0-99*]

Nicotine dependence: Fagerström Test

In the past 7 days, how many cigarettes did you smoke on a TYPICAL DAY? (Please type in your answer)	[*number box, range 0-99*]
How soon after you wake up do you smoke your FIRST cigarette?	Less than 5 minutes 6 to 30 minutes 31 to 60 minutes More than 60 minutes
Do you find it difficult to refrain from smoking in places where it is forbidden, such as in church, at the library, or at the movies?	Yes No
Which cigarette would you hate most to give up?	First one in the morning

	All others
Do you smoke more cigarettes during the first hours after waking up than during the rest of the day?	Yes No
Do you smoke if you are so ill that you are in bed most of the day?	Yes No

Quit Attempts

In the past 12 months, how many times have you stopped smoking for one day or longer because you were trying to quit smoking? (Please type in your answer)	[*number box, range 0-99*]

Contemplation Ladder

Choose the number that describes where you are now in thinking about quitting smoking:	10 I am taking action to quit smoking 9 8 I am starting to think about how to reduce the number of cigarettes I smoke a day 7 6 5 I think I should quit smoking but I am not quite ready 4

	3 2 I think I need to consider quitting someday 1 0 I have no thoughts about quitting smoking

Now you will see a message which may be used in the future on television. Please read the message carefully. After you see the message, you will be asked some questions about what you read.

[Exposure to message occurs here]

Message Evaluations

Value Content

This message is about how as a smoker/non-smoker, you have less/more…

Self-Direction

Freedom to act the way you want	Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree
Independence and self-reliance	
Choice in your behaviors	

Power Content

Control over other people	Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree
Authority and the right to be a leader	
Social status and respect by others	

Perceived Effectiveness

The information in the messages…

helps me feel confident about quitting smoking	Strongly disagree Disagree Neither agree nor
puts thoughts in my mind about quitting smoking.	
puts thoughts in my mind about wanting to continue	

smoking.	disagree
is convincing.	Agree
is believable.	Strongly agree

Personal Relevance

The information in the messages…

applies to me.	Strongly disagree
is relevant to my everyday life.	Disagree
is important to me.	Neither agree nor disagree
	Agree
	Strongly agree

Defensive Processing

The information in the messages…

is exaggerated.	Strongly disagree
is dishonest.	Disagree
tries to manipulate me.	Neither agree nor disagree
makes me angry at the message and its sponsors	Agree
	Strongly agree

Demographic Questions

Are you male or female?	Male Female

Education

What is the highest level of school you completed or the highest degree you received?	Never attended school Elementary or grade school Some high school High school graduate or GED Some college College graduate Postgraduate/masters/doctorate/law/MD

Ethnicity

Are you Hispanic, Latino/a, or Spanish origin? (One or more categories may be selected)	Yes No

Race

What is your race? (One or more categories may be selected)	White Black or African American

	American Indian or Alaska Native Asian Indian Chinese Filipino Japanese Korean Vietnamese Other Asian Native Hawaiian Guamanian or Chamorro Samoan

Income

What was your annual household income from all sources in 2011? Was it…?	Less than $25,000 Between $25,000 and $49,999 Between $50,000 and $74,999 Between $75,000 and $99,999

	Between $100,000 and $149,999 $150,000 or more

APPENDIX D: Study 6 Survey Items

Eligibility

How old are you? (Please type in your answer)	[*number box, range 0-99*]

[If AGE <18 terminate survey]

Are you male or female?	Male Female

Have you ever done any of the following?

[Random order of items]

Gotten a vaccine against the flu, also known as flu shot or the influenza vaccine?	Yes No Not sure
Been screened to see if you have cancer or a malignancy of any kind?	
Been tested to see if you have Hepatitis C?	
Have you smoked at least 100 cigarettes in your entire life?	

[*If ≠ Yes terminate survey*]

In the past 30 days, have you smoked cigarettes every day, some days, or not at all?	Every day Some days

	Not at all

[If ≠ "Every Day" terminate survey]

Smoking-related Characteristics

Smoking Initiation Age

How old were you when you smoked your first whole cigarette? (Please type in your answer)	[*number box, range 0-99*]

Nicotine dependence: Fagerström Test

In the past 7 days, how many cigarettes did you smoke on a TYPICAL DAY? (Please type in your answer)	[*number box, range 0-99*]
How soon after you wake up do you smoke your FIRST cigarette?	Less than 5 minutes 6 to 30 minutes 31 to 60 minutes More than 60 minutes
Do you find it difficult to refrain from smoking in places where it is forbidden, such as in church, at the library, or at the movies?	Yes No
Which cigarette would you hate most to give up?	First one in the morning

	All others
Do you smoke more cigarettes during the first hours after waking up than during the rest of the day?	Yes No
Do you smoke if you are so ill that you are in bed most of the day?	Yes No

Quit Attempts

In the past 12 months, how many times have you stopped smoking for one day or longer because you were trying to quit smoking? (Please type in your answer)	[*number box, range 0-99*]

Contemplation Ladder

Choose the number that describes where you are now in thinking about quitting smoking:	10 I am taking action to quit smoking 9 8 I am starting to think about how to reduce the number of cigarettes I smoke a day 7 6 5 I think I should quit smoking but I am not quite ready 4

	3 2 I think I need to consider quitting someday 1 0 I have no thoughts about quitting smoking

[Skip to determinants of smoking cessation if condition = control]

Now you will see a message which may be used in the future on television.

After you see the message, you will be asked some questions about what you read.

Please watch the video closely.

The video will begin playing as soon as you hit the button below.

[Exposure to message occurs here]

Video Viewing Check

How well were you able to see the video?	Very well Somewhat well Not well I was not able to see the video

Determinants of Smoking Cessation

Cessation Intentions

In the next 30 days, how likely is it that you will do each of the following?

Try to quit smoking.	Definitely will not Probably will not Probably will Definitely will
Reduce the number of cigarettes I smoke in a day.	
Call a quitline.	
Quit smoking cigarettes completely.	
Talk to someone (friend, family member, spouse) about quitting smoking.	
Enroll in a smoking cessation program if one is available to me.	

Cessation Self-Efficacy

In the next 30 days, how sure are you that you could do the following things if you wanted to?

Quit smoking completely.	Not at all sure A little sure Somewhat sure Very sure
Avoid smoking when I am craving a cigarette.	
Avoid smoking when I am around friends who are smoking.	
Avoid smoking when I feel agitated or tense.	
Avoid smoking when someone offers me a cigarette.	

Smoking Cessation Attitudes

My quitting smoking tobacco cigarettes in the next three months would be:

Bad					Neither						Good
Unenjoyable					Neither						Enjoyable
Unpleasant					Neither						Pleasant
Foolish					Neither						Wise
Difficult					Neither						Easy
Harmful					Neither						Beneficial

Smoking-related Self-Concepts

Please tell us how much you agree or disagree with the following statements.

Smoker self-concept

[Random order of items in Table below]

Smoking is part of my self-image.	Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree
Smoking is part of who I am.	
Smoking is part of my personality.	

Abstainer self-concept

[Random order of items in Table below]

I am able to see myself as a non-smoker.	Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree
It is easy to imagine myself as a non-smoker.	
I am comfortable with the idea of being a non-smoker.	

Demographic Questions

Are you male or female?	Male Female

Education

What is the highest level of school you completed or the highest degree you received?	Never attended school Elementary or grade school Some high school High school graduate or GED Some college College graduate Postgraduate/masters/doctorate/law/MD

Ethnicity

Are you Hispanic, Latino/a, or Spanish origin? (One or more categories may be selected)	Yes No

Race

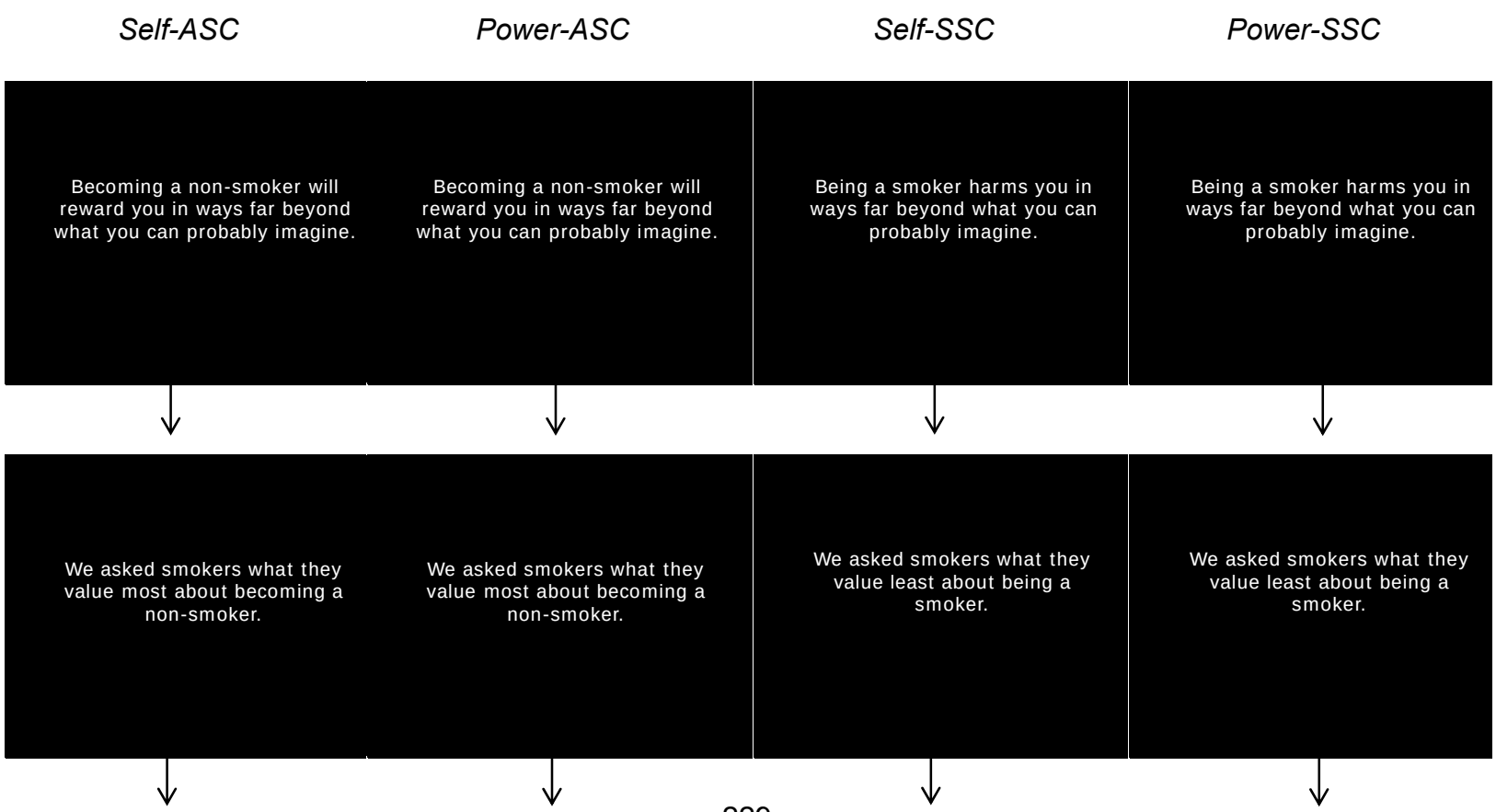
What is your race? (One or more categories may be selected)	White Black or African American American Indian or Alaska Native Asian Indian Chinese Filipino Japanese Korean Vietnamese Other Asian Native Hawaiian Guamanian or Chamorro Samoan

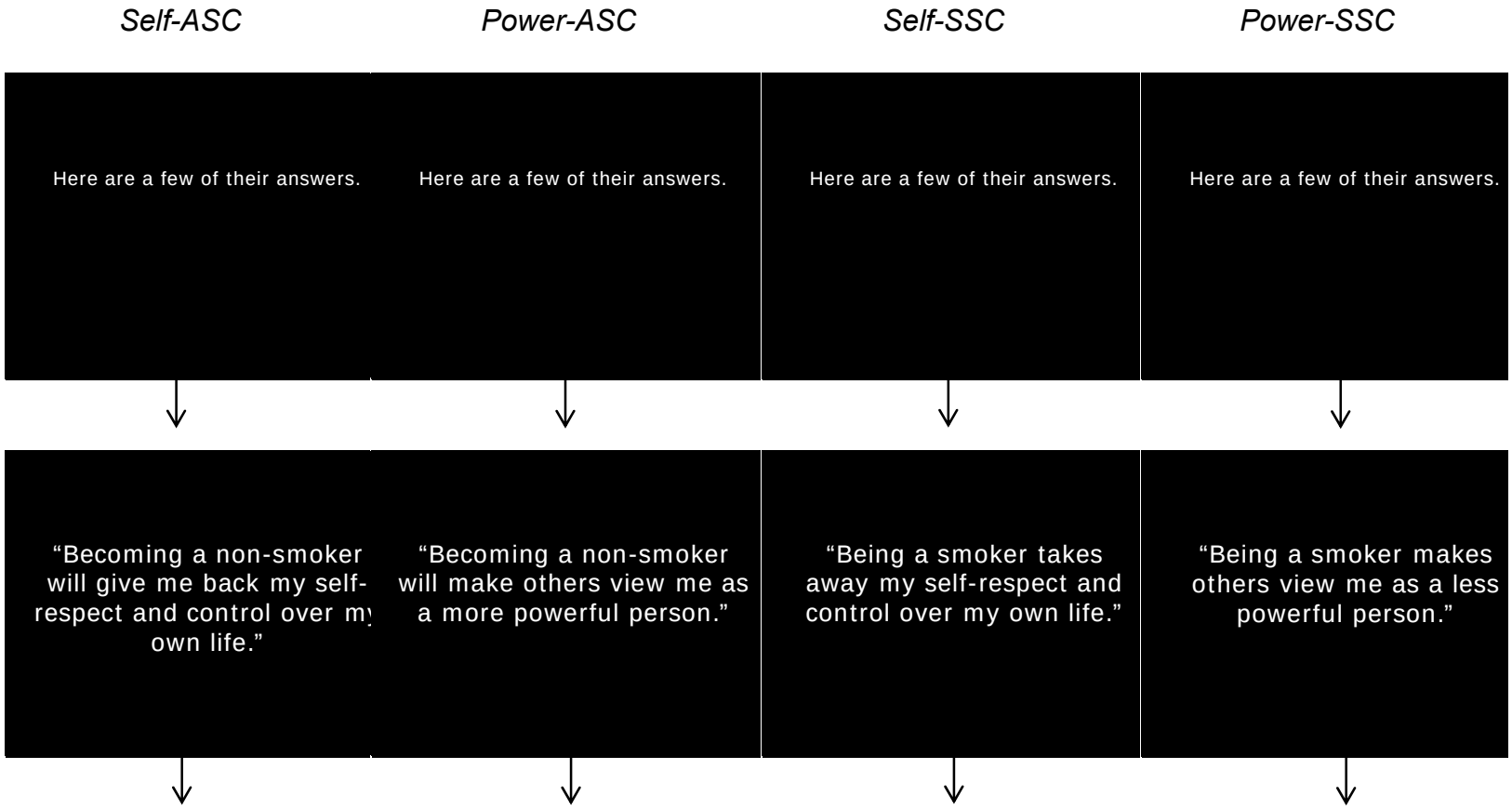
Income

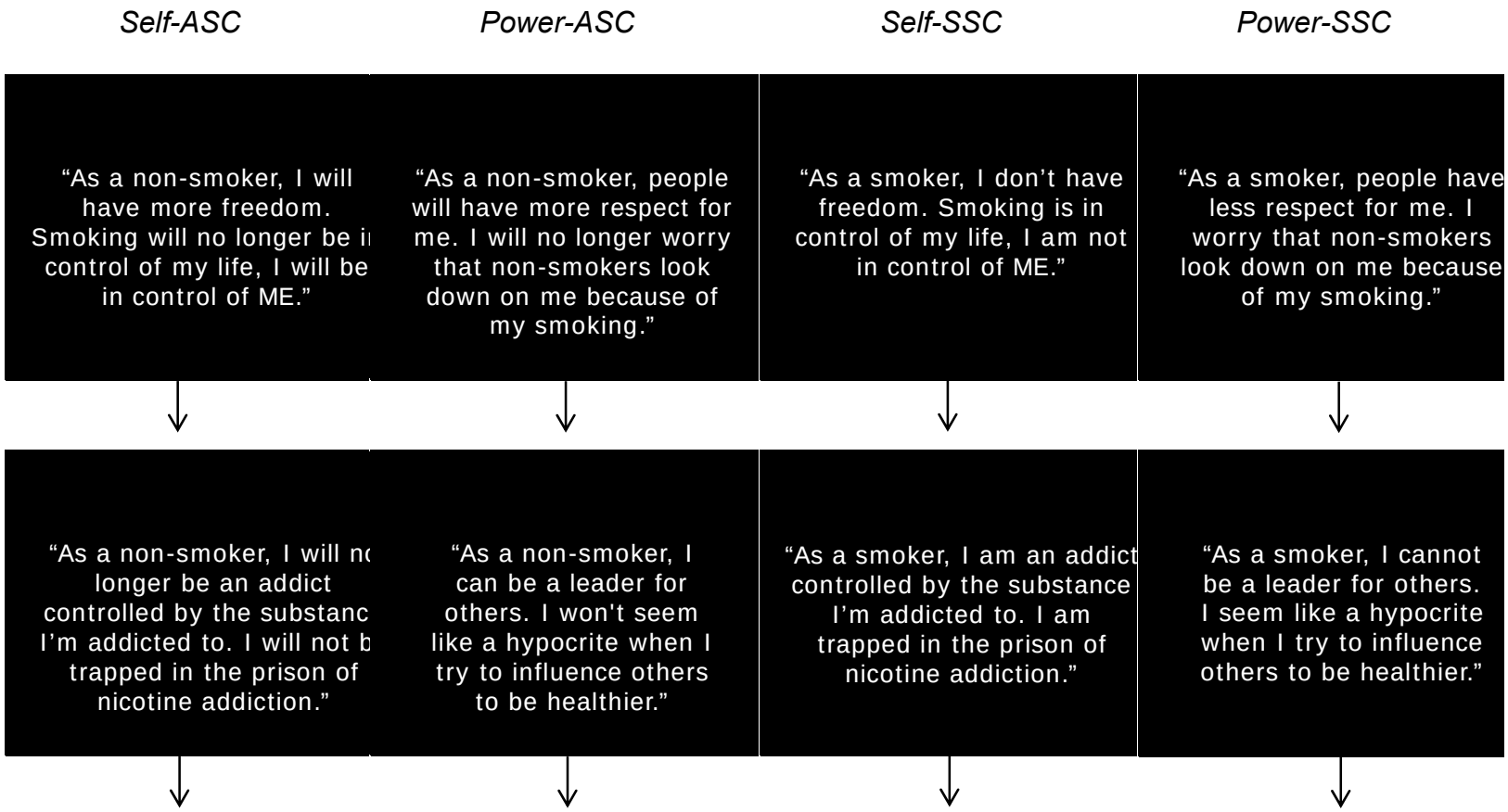
What was your annual household income from	Less than $25,000

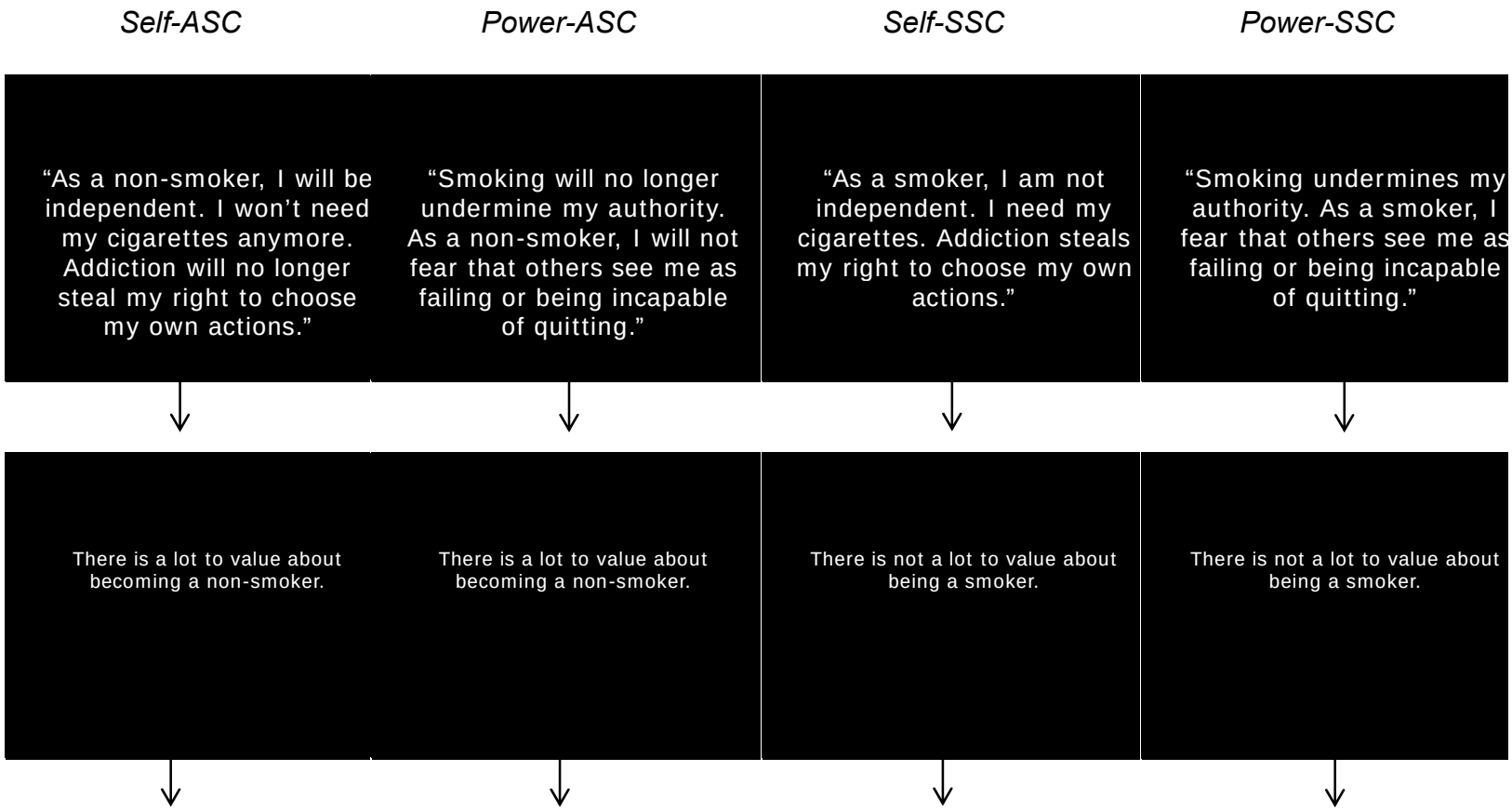
all sources in 2011? Was it…?	Between $25,000 and $49,999 Between $50,000 and $74,999 Between $75,000 and $99,999 Between $100,000 and $149,999 $150,000 or more

APPENDIX E: Main Study Manipulations




Self-ASC
Power-ASC
Self-SSC
Power-SSC
Here are a few of their answers.
Here are a few of their answers.
Here are a few of their answers.
Here are a few of their answers.
“Becoming a non-smoker will give me back my self-respect and control over my own life.”
“Becoming a non-smoker will make others view me as a more powerful person.”
“Being a smoker takes away my self-respect and control over my own life.”
“Being a smoker makes others view me as a less powerful person.”


Self-ASC
Power-ASC
Self-SSC
Power-SSC
"As a non-smoker, I will have more freedom. Smoking will no longer be i control of my life, I will be in control of ME."
"As a non-smoker, people will have more respect for me. I will no longer worry that non-smokers look down on me because of my smoking."
"As a smoker, I don't have freedom. Smoking is in control of my life, I am not in control of ME."
"As a smoker, people have less respect for me. I worry that non-smokers look down on me because of my smoking."
"As a non-smoker, I will n longer be an addict controlled by the substanc I'm addicted to. I will not b trapped in the prison of nicotine addiction."
"As a non-smoker, I can be a leader for others. I won't seem like a hypocrite when I try to influence others to be healthier."
"As a smoker, I am an addict controlled by the substance I'm addicted to. I am trapped in the prison of nicotine addiction."
"As a smoker, I cannot be a leader for others. I seem like a hypocrite when I try to influence others to be healthier."


Self-ASC
Power-ASC
Self-SSC
Power-SSC
"As a non-smoker, I will be independent. I won't need my cigarettes anymore. Addiction will no longer steal my right to choose my own actions."
"Smoking will no longer undermine my authority. As a non-smoker, I will not fear that others see me as failing or being incapable of quitting."
"As a smoker, I am not independent. I need my cigarettes. Addiction steals my right to choose my own actions."
"Smoking undermines my authority. As a smoker, I fear that others see me as failing or being incapable of quitting."
There is a lot to value about becoming a non-smoker.
There is a lot to value about becoming a non-smoker.
There is not a lot to value about being a smoker.
There is not a lot to value about being a smoker.

Self-ASC	*Power-ASC*	*Self-SSC*	*Power-SSC*
Become a non-smoker and take back your control over your own life. ...the freedom you're after is worth every bit of work it takes to achieve.	Become a non-smoker and make others see you as a more powerful person. ...the authority you'll gain is worth fighting for.	Don't let being a smoker take away your control over your own life. ...the freedom you're giving up is worth fighting for.	Don't let being a smoker make others see you as a less powerful person. ...the authority you're giving up is worth fighting for.

APPENDIX F: Supplementary Tables

Table A40. Study 2 Estimated coefficients of GLMs predicting smoking cessation self-efficacy (standard errors in parentheses)

	Model 1	Model 2	Model 3	Model 4
Variables	*B (se)*	*B (se)*	*B (se)*	*B (se)*
ASC	.34***		.32***	.28***
	(.03)		(.03)	(.03)
SSC		-.20***	-.05	-.04
		(.03)	(.03)	(.03)
FTND				-.03*
				(.01)
CL				.03*
				(.01)
Quit Attempts				3.30×10^{-3}
				(4.91×10^{-3})
Smoking Initiation Age				.01
				(.01)
Age				-1.25×10^{-3}
				(2.74×10^{-3})
Female				-.11*
				(.06)

Black				.03
				(.10)
Hispanic				-.17
				(.11)
Education				.02
				(.01)
Income				1.18×10^{-4}
				(9.13×10^{-5})
Intercept	1.29***	2.43***	1.45***	1.23***
	(.07)	(.07)	(.11)	(.23)
Adjusted R^2	.16	.05	.16	.19
F value	154.02***	42.22***	78.72***	15.58***

Note. $n = 806$. *$p < .05$;** $p < .01$; *** $p < .001$.

Table A41. Study 2 Estimated coefficients of GLMs predicting smoking cessation intentions (standard errors in parentheses)

	Model 1	Model 2	Model 3	Model 4
Variables	*B (se)*	*B (se)*	*B (se)*	*B (se)*
ASC	.34***		.34***	.15***
	(.03)		(.03)	(.03)
SSC		-.16***	-.01	1.72×10^{-3}
		(.03)	(.03)	(.03)
FTND				.01
				(.01)
CL				.17***
				(.01)
Quit Attempts				.02***
				(.00)
Smoking Initiation Age				.02*
				(.01)
Age				3.87×10^{-3}
				(2.29×10^{-3})
Female				.02
				(.05)
Black				.26**

				(.09)
Hispanic				.14
				(.09)
Education				.02
				(.01)
Income				-2.74×10^{-5}
				(7.63×10^{-5})
Intercept	1.80***	2.86***	1.83***	1.34***
	(.07)	(.07)	(.11)	(.19)
Adjusted R^2	.16	.03	.16	.43
F value	153.48***	27.54***	76.71***	50.08***

Note. $n = 806$. *$p < .05$;** $p < .01$; *** $p < .001$.

Table A42. Study 5 Estimated coefficients of GLMs predicting smoking cessation self-efficacy (standard errors in parentheses)

	Model 1	Model 2	Model 3	Model 4
Variables	*B (se)*	*B (se)*	*B (se)*	*B (se)*
ASC	.26***		.25***	.16*
	(.05)		(.06)	(.06)
SSC		-.15*	-.03	-.05
		(.06)	(.07)	(.07)
FTND				-.05
				(.03)
CL				3.53×10^{-3}
				(.03)
Quit Attempts				.07**
				(.02)
Smoking Initiation Age				.01
				(.02)
Age				-1.20×10^{-3}
				(.01)
Female				-.19
				(.12)
Black				-.36

				(.18)
Hispanic				-.33
				(.28)
Education				.07*
				(.04)
Income				-1.91×10^{-4}
				(1.81×10^{-4})
Intercept	1.40***	2.26***	1.48***	.10
	(.13)	(.15)	(.23)	(.77)
Adjusted R^2	.11	.03	.11	.25
F value	24.25***	5.78*	12.16***	4.41***

Note. $n = 173$. *$p < .05$;** $p < .01$; *** $p < .001$. Control in all models is study condition.

Table A43. Study 5 Estimated coefficients of GLMs predicting smoking cessation intentions (standard errors in parentheses)

	Model 1	Model 2	Model 3	Model 4
Variables	*B (se)*	*B (se)*	*B (se)*	*B (se)*
ASC	.30***		.30***	.11*
	(.05)		(.06)	(.05)
SSC		-.15*	-.01	.06
		(.06)	(.07)	(.06)
FTND				.02
				(.02)
CL				-.17***
				(.02)
Quit Attempts				.07***
				(.02)
Smoking Initiation Age				-.01
				(.01)
Age				.01
				(.00)
Female				.12
				(.10)
Black				-.06

				(.16)
Hispanic				.17
				(.23)
Education				-.05
				(.03)
Income				-6.8×10^{-6}
				(1.52×10^{-4})
Intercept	1.76***	2.73***	1.79***	3.56***
	(.13)	(.15)	(.23)	(.65)
Adjusted R^2	.15	.03	.15	.45
F value	32.58***	5.98*	16.22***	10.97***

Note. $n = 173$. *$p < .05$;** $p < .01$; *** $p < .001$. Control in all models is study condition.

Table A44. Study 6 Estimated coefficients of GLMs predicting smoking cessation self-efficacy (standard errors in parentheses)

	Model 1	Model 2	Model 3	Model 4
Variables	*B (se)*	*B (se)*	*B (se)*	*B (se)*
ASC	.46***		.48***	.40***
	(.02)		(.02)	(.03)
SSC		.03	.12***	.09***
		(.03)	(.02)	(.02)
FTND				-4.85×10^{-3}
				(.01)
CL				-.06***
				(.01)
Quit Attempts				.02***
				(.00)
Smoking Initiation Age				.01*
				(.00)
Age				-.01**
				(.00)
Female				-.07
				(.05)

Black				.18*
				(.08)
Hispanic				.08
				(.09)
Education				.04**
				(.01)
Income				1.09×10^{-4}
				(6.63×10^{-5})
Intercept	1.03***	2.13***	.73***	.89***
	(.06)	(.06)	(.08)	(.26)
Adjusted R^2	.26	.00	.27	.37
F value	413.37***	1.09	225.24***	51.33***

Note. n = 1,084. *p < .05;** p < .01; *** p < .001. Control in all models is study condition.

Table A45. Study 6 Estimated coefficients of GLMs predicting smoking cessation intentions (standard errors in parentheses)

	Model 1	Model 2	Model 3	Model 4
Variables	*B (se)*	*B (se)*	*B (se)*	*B (se)*
ASC	.42***		.43***	.27***
	(.02)		(.02)	(.02)
SSC		-.02	.06**	.03*
		(.02)	(.02)	(.02)
FTND				.02**
				(.01)
CL				-.08***
				(.01)
Quit Attempts				.01***
				(.00)
Smoking Initiation Age				.01
				(.00)
Age				-3.88×10^{-3}**
				(1.17×10^{-3})
Female				.05
				(.03)
Black				.18***

				(.05)
Hispanic				.08
				(.06)
Education				.03***
				(.01)
Income				9.22×10^{-5} *
				(4.64×10^{-5})
Intercept	1.38***	2.50***	1.24***	1.81***
	(.05)	(.05)	(.06)	(.18)
Adjusted R^2	.34	.00	.34	.44
F value	608.7***	1.28	313.04***	70.16***

Note. n = 1,084. *p < .05;** p < .01; *** p < .001. Control in all models is study condition.

Table A46: Estimated coefficients of GLM predicting ASC from pooled samples (standard errors in parentheses)

	ASC	SSC
Variables	*B (se)*	*B (se)*
FTND	-.09***	.12***
	(.01)	(.01)
CL	.08***	-.04***
	(.01)	(.01)
Quit Attempts	.01***	-9.8×10^{-4}
	(.00)	(2.2×10^{-3})
Smoking Initiation Age	.01*	-.01*
	(.00)	(.00)
Age	6.4×10^{-4}	-2.4×10^{-3}*
	(1.1×10^{-3})	(1.1×10^{-3})
Female	-.01	.22***
	(.03)	(.03)
Black/ African-American	.19***	-.13***
	(.03)	(.04)
Hispanic/ Latino	-.01	.03
	(.04)	(.04)
Education	.01	.05***

	(.01)	(.01)
Study 1	.43***	-.15*
	(.07)	(.08)
Study 2	-.07	-.08
	(.10)	(.10)
Study 3	--	
Intercept	2.13***	2.06***
	(.07)	(.07)
Adjusted R2	.144	.105
F value	69.96***	49.78***

Note. n = 4,660. *p < .05; *** p < .001.

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